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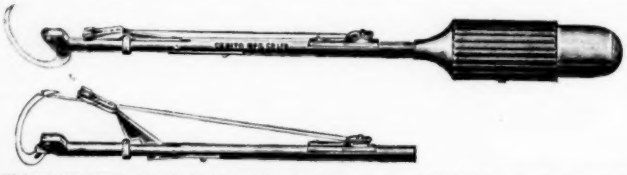

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BY SIR WILLIAM WILLCOX, K.C.I.E., C.B., C.M.G., M.D., F.R.C.P. LOND.,
PHYSICIAN TO ST. MARY'S HOSPITAL.

(WITH COLOURED PLATE.)

LECTURE I.

DURING the late war the frequent occurrence of toxic jaundice amongst munition workers and those engaged in the manufacture of aeroplanes offered numerous opportunities for close study of the causes and clinical and pathological manifestations of this disease. In the various campaigns all over the world in which our troops played an important part epidemics of toxic jaundice were common. These outbreaks showed that "toxic jaundice" was not limited in its ætiology to chemical poisons, but that toxins of biological origin were even more fertile in its causation.

Since 1919 great advances have been made in our knowledge of the pathology of jaundice, of which perhaps the most important have been the brilliant researches of Hijmans van den Bergh, which have added much to accuracy and precision in diagnosis. The valuable and thoughtful studies of Dr. W. J. McNee have done much to elucidate our knowledge of the causation. The 1929 edition of "Diseases of the Liver and Gall-bladder and Bile-ducts," by Sir Humphry Rolleston and Dr. McNee, has also been of great value in the review and criticism of the recent work on jaundice of toxic origin.

A special reason for my selection of this subject is the frequent occurrence, during the last few years, of delayed, dangerous, and sometimes fatal cases of toxic jaundice due to the administration of recently discovered drugs. One of the most important group of drugs, from this point of view, is the quinophan group, which includes preparations known by the names of Atophan, Cincophen, Phenoquin, Agotan, Atophanyl, and Atoquinol, all of them derivatives of quinoline.

DEFINITION OF JAUNDICE.

Osler gives the following brief but excellent definition in his Text-book of Medicine: "Jaundice or icterus is a condition characterised by coloration of the skin, mucous membrane, and fluids of the body by the bile-pigments." It must be remembered that jaundice is a symptom of some underlying condition which causes an accumulation of bile-pigment (bilirubin) in the blood beyond the normal limits.

This accumulation may be caused, as in "obstructive jaundice," by mechanical obstruction of the common bile-duct or common hepatic duct whereby the bile-pigments are reabsorbed into the blood and lymphatic circulation. In toxic jaundice some toxic factor impairs the excretory power of the liver cells for removing bile from the blood, and often at the same time causes an excessive destruction of red blood corpuscles, with a consequent increased production of bile-pigments. Thus, in attempting to classify the various forms of jaundice, consideration must be given not only to the presence of bile-pigment in the blood in increased amount, but also to the clinical symptoms caused by the underlying condition responsible for the jaundice.

Recent biochemical researches have enabled us to make accurate estimations of the bilirubin in the blood. According to van den Bergh [1 2] normal human serum contains from 1 in 1,000,000 to 1 in 400,000 parts of bilirubin. He gives as 1 unit an amount of 1 in 200,000, so that the normal bilirubin content of the serum would be ½ unit. He showed that there were many conditions in which the bilirubin content might rise to figures from ½ up to 4 or 5 units without clinically definite jaundice of the skin and mucous membranes. This state of the blood has been described as "latent jaundice," and some common examples are pernicious anæmia, chronic hepatic disease such as cirrhosis, and the blood state following the administration of certain drugs, such as arsenobenzol derivatives, which have a known toxic action on the liver and which have not yet produced manifest jaundice.

The bilirubin content of the blood has been also estimated by a method published by Meulengracht in 1921.[3] In this the colour of the serum is matched against a solution of bichromate of potash. A tint corresponding to a solution of 1 in 10,000 is fixed as 1 unit. The colour of the blood-serum is given as so many units according to this scale, and is termed the "icterus index." Normal blood-serum, according to this method, would have a value of 1 to 5 units. In latent jaundice the figure would be from 6 to 15 units. An icterus index of over 15 units would occur when clinically definite jaundice was observable.

False jaundice may occur from the coloration of the skin by dyes of various kinds, such as saffron, turmeric, and trinitrotoluene. It may also occur from taking by the mouth picric acid or other absorbable yellow dyes which stain the tissues. The application of van den Bergh's bilirubin test to the blood-serum would at once differentiate these spurious forms from true jaundice.

CLASSIFICATION OF JAUNDICE.

The simplest and most satisfactory classification is that adopted by Rolleston and McNee—viz.: (1) obstructive hepatic jaundice; (2) toxic and infective hepatic jaundice; (3) hæmolytic jaundice. No classification can be perfect, since the different varieties of jaundice are often combined. Thus in toxic jaundice there is frequently an obstruction to the smaller bile-ducts in the liver as part of the hepatitis set up by the toxic agent. Then, again, hæmolytic jaundice may be combined with toxic jaundice when the toxic agent, such as arseniuretted hydrogen or the toxin of yellow fever, has a destructive action on both the blood and liver cells. It is proposed to include under the term "toxic jaundice" jaundice due to the action of exogenous chemical poisons, or to toxins of extraneous or autogenous biological origin. This will include all of group (2) in the above classification and some types of group (3). It will, of course, include the toxæmias of pregnancy and acidosis, which are associated with jaundice.

In a recent paper Dr. Arnold Rice Rich suggests that the classification of jaundice given above is unsatisfactory, and divides jaundice into two groups:

1. *Retention jaundice*, where an indirect van den Bergh reaction is given. The urine contains no bilirubin or

* The Lumleian Lectures delivered before the Royal College of Physicians of London on March 19th, 24th, and 26th, 1931.

bile-salts but increased urobilin, while the stools have increased urobilin. This group includes the various forms of hæmolytic jaundice and jaundice resulting from anoxæmia.

2. *Regurgitation jaundice*, where a positive van den Bergh reaction is given. The urine contains bile-pigment and bile-salts and the stools decreased urobilin. This group includes the various forms of jaundice associated with necrosis of the liver cells—i.e., toxic jaundice of chemical or biological origin as included by me in these lectures, and also the various forms of obstructive jaundice due to mechanical obstruction of the main bile-ducts.

In my opinion the suggested new classification is unsatisfactory because it does not attach sufficient importance to and differentiation of the clinical symptoms of the general underlying cause of the jaundice. Thus the jaundice due to phosphorus poisoning is so essentially different clinically from the jaundice following simple stricture of the common bile-duct that to group these two conditions under the same heading is very undesirable. Then, again, while the jaundice of necrosis of the liver cells may be obstructive in type for a few days and give the laboratory findings of regurgitation jaundice, clinical observation shows that in non-fatal cases these laboratory findings do not persist but quickly change into those partly resembling the so-called retention jaundice.

Another reason which makes this classification unacceptable is that it is based on the variations of the van den Bergh reaction. The present state of our knowledge of this reaction does not admit of a classification of jaundice based on the varieties exhibited by it. Thus, in a discussion on jaundice at the British Medical Association annual meeting in 1924 [6] Dr. van den Bergh was the first to admit that the causation of the variations of his reaction, such as the biphasic and delayed and the indirect type, were not fully understood. Most observers in this country have found that in cases of deep jaundice the van den Bergh reaction is not of much help in the differentiation of the type, since in such cases a marked biphasic reaction is usually given.

Liver Functions in Relation to Toxic Jaundice.

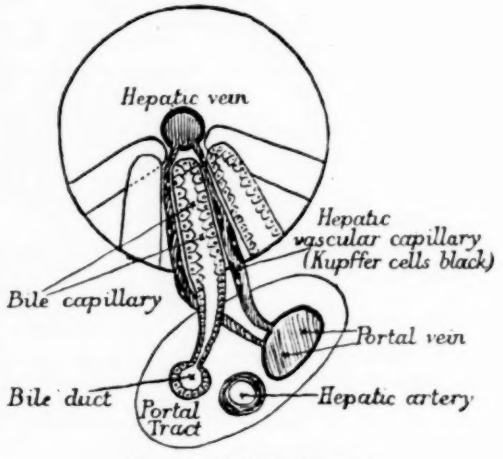
The liver plays a most important part in the body metabolism, and impairment of its metabolic functions quickly leads to toxic symptoms which are commonly accompanied by more or less deep jaundice. The liver cell is the dominant factor in the regulation of the complicated biochemical processes going on in the body. So complex are these processes, and so little understood, that the part played by the liver is probably much more profound than is at present realised. We know that complete suspension of the liver function means speedy dissolution and death in a very few days from auto-intoxication.

BILE.

The theory of bile-pigment production and bile secretion put forward by Dr. McNee in his critical review of jaundice in 1923 is now generally accepted.[7] The diagram from that paper, which is published by his kind permission, illustrates the essential points (Fig. 1). The bile-pigments are produced from hæmoglobin by the destruction of red blood corpuscles in the phagocytic cells of the recticulo-endothelial system, these cells being known as Kupffer cells. It is known that this destruction of red blood corpuscles takes place in the Kupffer cells in the liver, spleen, and bone-marrow. It is in these cells that bilirubin is produced. The bilirubin circulates in the hepatic capillaries, and passes from them into the bile capillaries lying in the centre of the liver tubules. If the liver cells are healthy the bilirubin passes through them and becomes combined in some loose way with bile-salts and cholestrin. This association of the bilirubin prevents its adsorption by the proteins of the plasma, and bilirubin in this state will give a direct van den Bergh reaction.

In some conditions—for example, in anoxæmia of the liver cells whereby their function is seriously impaired—the bilirubin from the hepatic capillaries cannot be fully absorbed by the damaged liver cells, and as a consequence it remains in the blood stream, entering into physical combination with the proteins of the plasma. In this condition the blood-serum

FIG. 1.



A liver lobule (diagrammatic).

only gives a van den Bergh reaction after treatment with alcohol, whereby the bilirubin is separated from the plasma proteins. In other words, an "indirect ven den Bergh" reaction occurs. This condition of things happens in acholuric jaundice and in various forms of hæmolytic jaundice, especially when associated with anæmia which causes anoxæmia of the liver cells.

"FAT METABOLISM."

Normally a certain amount of fat is stored up in the liver cells, and this consists mainly of unsaturated fatty acids in organic combination. In conditions of toxic jaundice fatty degeneration is often a marked feature, and the liver cells become engorged with fat. This fat differs chemically from the fat deposited in the liver cells under normal physiological conditions. It is composed of saturated fatty acids in organic combination.

Very marked fatty degeneration and distension of the liver cells with fat is met with in toxic jaundice from such chemical poisons as chloroform, phosphorus, alcohol, trinitrotoluene, and tetrachlorethane; it is also seen in the toxic jaundice associated with acute or subacute hepatic necrosis or with conditions of auto-intoxication such as acidosis or the toxæmias of pregnancy. A. G. R. Foulerton published an interesting paper on this subject in 1918.[8]

"GLYCOGEN FUNCTION."

The presence of glycogen in the liver cells seems to increase their power of resistance to toxic agents. Glycosuria has sometimes been observed in toxic jaundice. Garrod [13] has recorded a case of glycosuria in catarrhal jaundice, and glycosuria has been

observed in the toxic jaundice of phosphorus, chloroform, and other poisons.

As a converse to this, an interesting case was reported by J. Bordley.[9] A patient, aged 47, who had suffered for eight years from severe diabetes mellitus, at the end of this period developed hepatic cirrhosis with ascites. At this stage the blood-sugar became normal and the diabetes disappeared. Claude Bernard recorded a similar case in 1877, where a man, aged 55, lost the symptoms of diabetes mellitus at the onset of portal cirrhosis and ascites.

PROTEIN METABOLISM.

The most important function of the liver is the part its cells play in breaking down the complex products of protein metabolism, many of which have powerful toxic properties, into simple nitrogenous compounds such as urea, uric acid, creatinine, and hippuric acid, which are eliminated by the kidney. When the liver cells are so damaged by the action of chemical or biological poisons that this function is impaired, symptoms of the gravest kind may set in and death result from the rapidly developing auto-intoxication caused by the toxic effects of the complex intermediate products of protein metabolism.

TOXIPHYLACTIC FUNCTION.

A most important function of the liver is its protective function, whereby the body is protected against exogenous poisons. The term "toxiphylactic function" was suggested by me in 1922.[10]

If the poison is absorbed by the alimentary tract it is conveyed by the portal vein to the liver, which absorbs much of the poison and acts as the first line of defence. When the poisons are introduced into the general circulation as, for example, the intravenous injection of arsenobenzol derivatives, the liver absorbs much of the poison from the blood stream and so protects the other tissues of the body. In exerting its prophylactic function the liver itself often suffers severely, and its cells may undergo fatty degeneration, cloudy swelling, or even extensive necrosis. In addition, an inflammation of the interstitial tissues may be set up and a progressive hepatitis with fibrosis result. In cases of fatal poisoning, whether from mineral poisons such as arsenic and lead, or from organic poisons such as morphine and strychnine, the greater part of the poison is found in the liver and this organ is the most important for reservation for analysis. The poison found in the liver is poison which has already exerted its toxic effect on the body, whereas that found in the alimentary tract is unabsorbed and has not exerted its toxic effects on the tissues of the various body organs.

A striking example was the Maybrick case, where the deceased had lived for several days after the administration of arsenic. In this case no arsenic was found in the stomach, and a trace only in the kidneys, while the liver contained about gr. $\frac{1}{3}$.

It is important to remember that some poisons, which are rapidly eliminated or which may undergo oxidation in the body, may irreparably damage the liver, so that it undergoes extensive necrosis and death results several days after the taking of the poison. The terminal symptoms are due to the endogenous poisons consequent on cessation of liver function, not to the continued action of the exogenous poisons originally taken. Examples of this are phosphorus, delayed chloroform poisoning, and tetra-chlorethane poisoning. In such cases no trace of the original chemical poison may be expected to be present in the body at the time of death.

Liver Function Tests.

Much work has been done in attempting to discover a satisfactory test for liver function analogous, for example, to the blood-urea test for renal function. At the present time, it must be admitted, most of the tests for hepatic function are unsatisfactory in that they fail to indicate the impending danger of that complete breakdown of hepatic function which usually terminates fatally in a very few days.

The *van den Bergh test* and the *icterus index* are of value in indicating the bile-regulating mechanism of the liver, but this is not the function of vital importance. High values of these tests are not necessarily indicative of complete breakdown of hepatic function. It is the function of the hepatic cells which it is so necessary to determine. The liver is very uniformly supplied with blood and the loss of function of the hepatic cells is nearly always due to the flood of toxins carried to them by the blood stream. The individual liver cells are therefore submitted to the same toxic influences; in other words, they stand or fall all together. This explains the fact that many of the tests do not show a positive indication of loss of hepatic function until too late—i.e., until a condition of acute and fatal necrosis has set in.

The *lævulose test* is, in my experience, the most valuable and sensitive test, and that which best shows early impairment of function. The healthy liver can dispose of 50 g. of lævulose taken by the mouth so that there is no rise of blood-sugar. If the cells are impaired in function a definite rise occurs.

The *phenoltetrachlorphthalein* and *bromsulphalein tests.*—One of these substances is injected intravenously in calculated amount. If hepatic function is normal practically no dye will be left in circulation after half an hour. Where the liver function is impaired, appreciable quantities of the dye remain in circulation. These tests have found much favour in America. They are well described by Dr. G. A. Harrison.[11]

The lipase test, the fibrinogen test, the nitrogen partition test, and other tests have been found to be of little or no clinical value. They are subject to other influences than variation in hepatic function, and marked results are only given when it is too late—i.e., when an extreme degree of hepatic necrosis has developed.

Morbid Anatomy and Histology.

In toxic jaundice the liver may be greatly enlarged and on section show a striking yellow appearance, due to the excessive deposition of fat in the liver cells, and pieces of such livers may float in water. This type of liver is seen in delayed chloroform poisoning, in the fatal acidosis of children, in phosphorus poisoning where death occurs early, and in some cases of alcoholism.

I was informed by the late Sir Norman Moore, who was an acknowledged authority on both medicine and literature, that the term "cirrhosis" was originally applied to livers showing a marked yellow appearance, and that etymologically this is the correct application of the term, for it is derived from the Greek word "kirros," meaning reddish yellow or tawny. Of late years the term "cirrhosis" has become restricted to livers showing fibrotic changes such as occur in the portal cirrhosis of alcoholism.

Acute and subacute necrosis of the liver is the most common condition found in fatal toxic jaundice. It is described below under "necrosis of the liver."

The following microscopical changes are seen:—

(1) *Cell degeneration.*—The liver cells commonly show extensive fatty degeneration and are distended with fat. In some cases marked cloudy swelling is observed.

(2) *Necrosis of liver cells.*—The cells may be necrosed and granular, their nuclei having disappeared, or the cells may have entirely disintegrated and disappeared.

(3) Fibrous tissue may have developed in areas formerly occupied by liver cells (replacement fibrosis).

(4) Active progressive fibrosis with round-cell infiltration may be present.

(5) Regeneration of liver cells may occur in the less severe cases. The regenerated cells do not form themselves into the architectural structure of physiological lobules but are isolated masses of liver cells.

(6) Proliferation of the cells of the bile canaliculi may occur in the less acute cases.

Illustrations and Cases.

The accompanying coloured plate reproduces drawings of microscopical sections from six recent fatal cases of toxic jaundice, and these illustrate all the important points. The cases may be briefly summarised as follows:—

CASE 1.—*Phosphorus poisoning.* (P.M. 141/29.) Male, aged 22. Admitted to St. Mary's Hospital two hours after taking rat poison (phosphorus). Continued vomiting occurred. After three days jaundice developed and deepened, the liver became enlarged, the stools were clay-coloured. Death followed six days after taking the poison. The liver was found to weigh 1850 g. The cut surface was bright yellow with several subcapsular hæmorrhages. Microscopically there were extreme fatty changes more marked at periphery of lobules where cells have lost their nuclei and are represented by large fatty globules. (See Plate, Fig. I.) Stained with hæmatoxylin and Sudan III. (×60.)

CASE 2.—*Cirrhosis of liver following novarsenobillon injections.* (P.M. 4/29.) Male, aged 63. Ten injections of 0·6 g. novarsenobillon given in February and March, 1928, the last on March 25th. On August 1st, 1928, jaundice developed; this was followed by ascites, paracentesis abdominalis being performed nine times. Wassermann reaction negative; van den Bergh reactions biphasic. Death on Jan. 3rd, 1929. At autopsy the liver was small (900 g.) with a thickened capsule. On section it had a finely granular surface with yellow areas of regeneration nodules and intervening greyish fibrous tissue.

Microscopical examination showed a thickened capsule; large numbers of proliferating bile-ducts; round-celled infiltration and young fibrous tissue; and liver cells, some regenerating and some dying,—many containing bile. (Fig. II.) Stained with hæmatoxylin and eosin. (×60.)

CASE 3.—*Subacute necrosis, toxic jaundice.* (P.M. 228/26.) Male, aged 58. Malaise from Nov. 15th, 1926. On Nov. 22nd, 1926, nausea and vomiting, hepatic discomfort. On the 25th, jaundice set in, which rapidly deepened. On the 27th, the patient was delirious, the stools were pale, and van den Bergh's reaction was biphasic. The Wassermann reaction was negative. The urine contained albumin, granular and hyaline casts. On Dec. 2nd coma developed and death occurred on the 5th. The liver was small (950 g.), soft, and flabby with a mottled yellow and grey surface. On section it was yellow with a few red areas. The microscopical section shows dilatation of sinusoids in areas where liver cells have died and been autolysed. The remaining liver cells have undergone fatty changes and many contain bile. (Fig. III.) Stained with hæmatoxylin and eosin. (×95.)

CASE 4.—*Alcoholic cirrhosis.* (P.M. 101/26.) Female, aged 54. History of chronic alcoholism for over ten years. Ascites. Paracentesis abdominalis twice in 1926. On June 15th, 1926, hæmatemesis; death on June 18th. The liver was small (1325 g.) and pale, with a coarsely granular hobnailed surface. Section showed coarse strands of pale fibrous tissue uniformly distributed throughout the organ. The spleen was enlarged. Microscopical examination showed regeneration nodules surrounded by fibrous and elastic tissue. Also much fat in the liver cells. (Fig. IV.) Stained with hæmatoxylin, Weigert's elastic stain, and Sudan III. (×60.)

CASE 5.—*Eclampsia. Toxic jaundice.* (P.M. 66/28). Female, aged 41. Admitted in coma following a fit in the first stage of labour, slightly jaundiced. Died 29 hours after delivery. Post-mortem: the liver was large (1600 g.) and swollen, with several subcapsular hæmorrhages. On section the cut surface swelled over the capsule and had numerous irregular greyish-yellow necrotic areas surrounded by hæmorrhage. The microscopical section includes a focus (near a portal system not shown in drawing) of necrotic liver cells surrounded by a zone of fatty cells and hæmorrhage. The liver cells show cloudy swelling. (Fig. V.) Stained with hæmatoxylin and Sudan III. (×90.)

CASE 6.—*Delayed chloroform poisoning.* Girl, aged 17. Admitted to hospital for difficult labour April 21st, 1928. On April 22nd, anæsthetic (chloroform), forceps delivery. On April 23rd, patient drowsy, general condition good. Next day slight jaundice, very drowsy, restless, noisy, knee-jerks exaggerated. Plantar reflex showed extensor responses, some rigidity and spasm of muscles. In evening coma, eyes moving laterally, twitchings of muscles. Jaundice increased. Urine had trace of albumin and some diacetic acid. Death on April 25th. At autopsy the liver was found to be enlarged, soft, and flabby (weight 1800 g.). The colour was yellow with a lobular pattern and subcapular reddish spots. On section cut surface swelled over capsule. There were yellow areas round central veins of lobules surrounded by red areas, and the periphery of the lobules was grey. Near the hilum there were large areas of yellow necrotic tissue where whole lobules are necrotic. Microscopically central necrosis is seen; the periphery of lobules shows fatty degeneration. (Fig. VI.) Hæmatoxylin and Sudan III. (×75.)

Pathology of Toxic Jaundice.

From the morbid conditions resulting from the pathological changes caused by the toxic agents which cause toxic jaundice it is clear that the dominant factor in the causation of clinical effects is the damage to the liver cell.

The intensity of the jaundice in any given case is no criterion of the clinical symptoms or of the prognosis as regards life in any given case. Jaundice may be very deep and yet recovery may be complete, without dangerous symptoms supervening, as is seen in epidemic catarrhal jaundice; on the other hand, jaundice may be slight, and dangerous symptoms followed by death may rapidly develop, as in delayed chloroform poisoning and the toxæmias of pregnancy.

Many factors have to be considered, and it must be borne in mind that the same poison may produce any of the morbid histological changes in the liver already described. In one patient this poison may exert its toxic influence directly on the liver cells, causing fatal loss of function, while the same poison in another case may exert a less severe action on the liver cells but produce changes in the bile-ducts and intrahepatic fibrous tissue. In the former case jaundice may be slight and death rapid, while in the latter jaundice may be marked and death delayed or averted. This condition of things is well illustrated in poisoning from arsenobenzol derivatives.

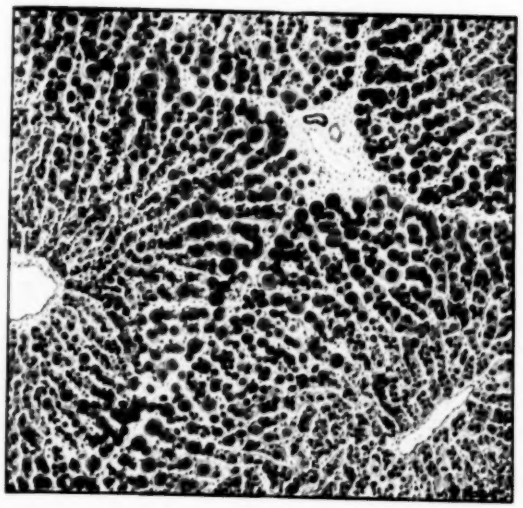
The factors to be considered are the poison, idiosyncrasy, and the time factor.

THE POISON.

Some poisons exert a profound and rapid action on the liver, for example, phosphorus, and death rapidly supervenes, with jaundice of varying degree. Arsenobenzol derivatives, such as salvarsan, may occasionally display this intensive action on the liver cells, causing death in a very few days with symptoms of profound auto-intoxication and only slight jaundice. On the other hand, the symptoms from this group of poisons may be delayed, and deep jaundice may result without dangerous clinical symptoms. The explanation of the variation in action must be the histological damage caused in the liver, and it is clear that this damage is not constant in type for the same poison.

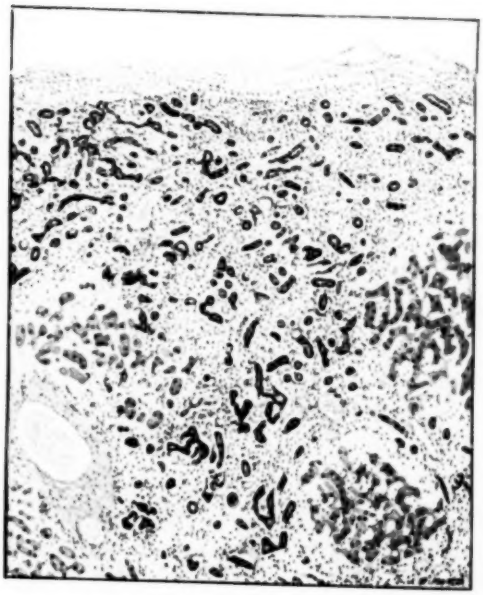
While poisons vary much in their intensity of toxic action on the liver—for example, chloroform is much more toxic than alcohol in its hepatic effects—yet the intensity of action is so variable in different individual cases that the prognosis must always be very guarded when symptoms of toxic jaundice develop, whatever the poison may be. *Epidemic*

FIG. I. (Case 1).



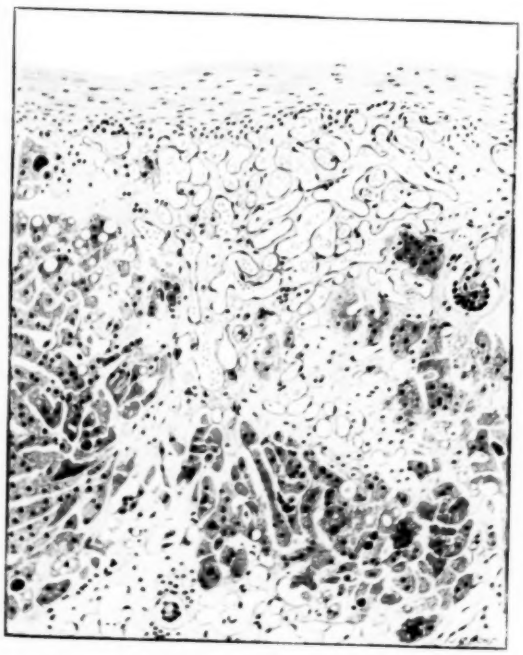
Phosphorus poisoning.

FIG. II. (Case 2).



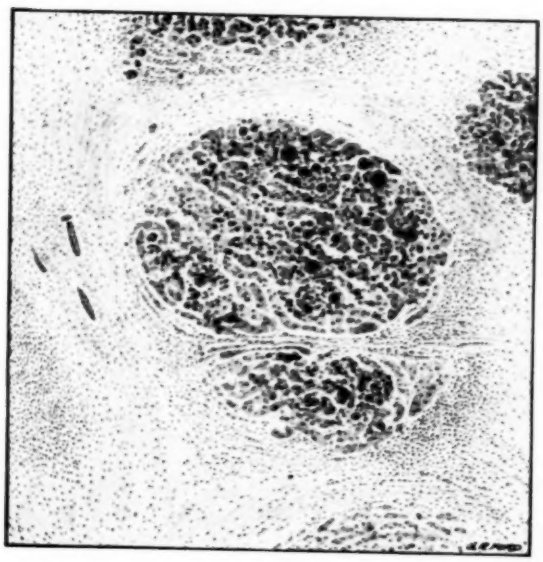
Cirrhosis of liver following N.A.B. injections.

FIG. III. (Case 3).



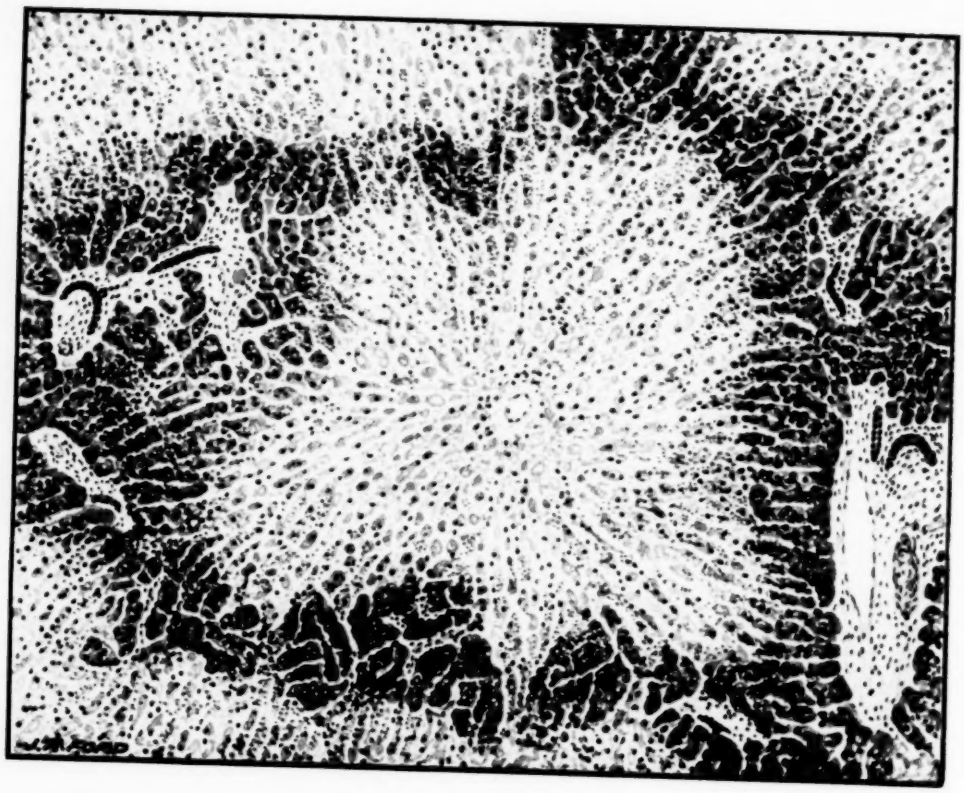
Subacute red necrosis.

FIG. IV. (Case 4).



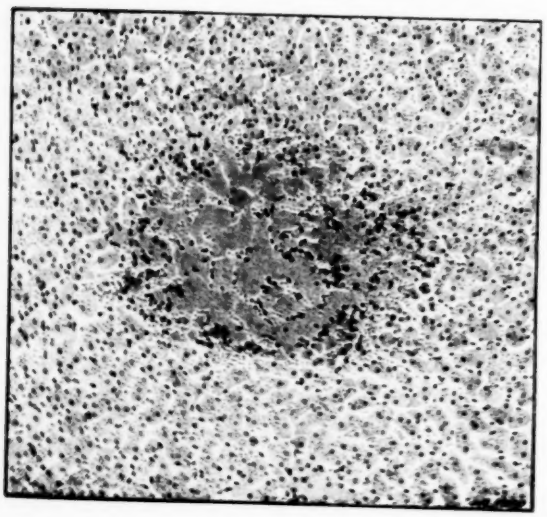
Multilobular alcoholic cirrhosis.

FIG. VI. (Case 6).



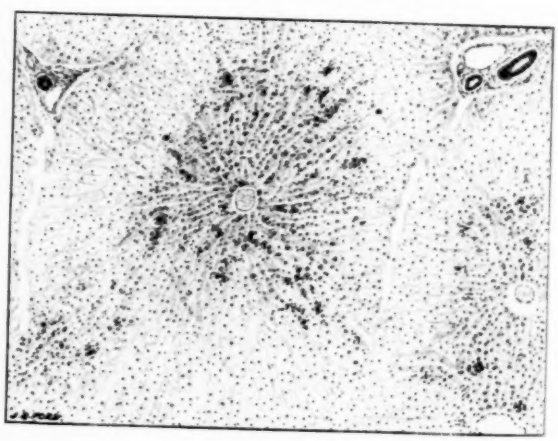
Delayed chloroform poisoning.

FIG. V. (Case 5).



Hæmorrhagic focal necrosis and cloudy swelling in eclampsia.

FIG. VII.
(Reference in Lecture II.)



Liver of rabbit after avertin anæsthesia.

catarrhal jaundice is caused by a toxin of biological origin which is usually quite mild in its clinical effects, yet in about 0·4 per cent. of cases of this disease acute necrosis of the liver cells occurs, with fatal results.

IDIOSYNCRASY

is an important factor, and why is should occur in individual cases is not fully understood. In some cases lack of nutrition of the liver cells may be an explanation, as, for example, the occurrence of delayed chloroform poisoning in patients after too prolonged fasting before the anæsthetic. In other cases there appears to be no explanation, for example:—

CASE 7.—A man, aged 32, gave a history of jaundice in 1915 during paratyphoid fever. In May, 1928, he contracted syphilis. On June 27th of the same year 0·3 g. and on July 2nd 0·45 g. of novarsenobillon were given intravenously. Jaundice developed on July 7th and cleared up in a few days. On the 27th 0·1 g. of novarsenobillon was given intravenously. This was followed by a severe attack of toxic jaundice lasting for three weeks, with recovery later. This is an example of marked idiosyncrasy to an arsenobenzol derivative.

CASE 8.—A man, aged 69, suffered from gout. On July 9th, 1925, he was given atophan, grs. 5, three times daily for six days, with bicarbonate of soda, grs. 30, night and morning. On August 8th jaundice developed; it deepened and symptoms of acute hepatic necrosis developed on Sept. 2nd, death resulting on Sept. 5th.

Many similar cases might be quoted, showing that idiosyncrasy plays a most important part in the causation of toxic jaundice and calls for the utmost care and watchfulness in the administration of drugs which have a selective toxic action on the liver.

THE TIME FACTOR.

The intensive action of a liver poison over a very short period of time is likely to cause acute degenerative changes of the hepatic cells and clinical symptoms of auto-intoxication accompanied by jaundice of varying intensity. Examples of intensive action of a liver poison over a short period of time are seen in toxic jaundice from chemical poisons—e.g., in phosphorus poisoning (Case 1) and in delayed chloroform poisoning (Case 6). Other examples are yellow fever, spirochætosis ictero-hæmorrhagica, and the jaundice associated with the auto-intoxication of acute acidosis in children. On the other hand, the action of the poison may be spaced out and more prolonged, so that the effect on the liver is less acute. A period of mild symptoms of auto-intoxication, commonly diagnosed as toxic gastritis, supervenes, and this is followed by toxic jaundice. In this condition acute necrosis of the liver cells may supervene, with a rapidly fatal termination, especially if the toxic agent is allowed to continue. If the toxic administration is stopped in time the undamaged liver cells may recover their function.

The necrosis of liver cells already effected may be followed by a fibrosis of the liver and symptoms of portal obstruction, such as ascites and hæmatemesis. Recovery in these cases is determined by the amount of destruction of the liver parenchyma. Cases of partial necrosis of liver cells due to toxic action are most variable in their clinical effects. There can be no doubt that a progressive hepatitis is often set up, and the onset of toxic jaundice may be delayed for many months.

The very great variations in the time factors in the clinical course of cases of toxic jaundice are not fully realised, but are important in treatment. For example, the long persistence of a deep jaundice might suggest that there must be some mechanical obstruction and indicate surgical interference.

I should like to emphasise strongly:—

(1) That when some toxic agent is at work such as trinitrotoluene, the atophan group of drugs, or the arsenobenzol group of drugs, the onset of jaundice may be very long delayed in its onset.

(2) That jaundice, having once set in, may continue for months or years without the existence of any mechanical obstruction of the large bile-ducts (hepatic or common bile-ducts), the jaundice being due solely to the toxic hepatitis, which may be progressive. It is important to realise this, because in such cases surgical interference is dangerous and often fatal.

As examples of (1) may be quoted the fact that toxic jaundice is often greatly delayed after the toxic blow has been delivered. Thus in salvarsan (arsenobenzol derivative) jaundice the onset of the jaundice may be several months after the last dose of the drug, In Case 2 an interval of over five months elapsed between the last dose of novarsenobillon and the onset of jaundice. Cases of longer interval than this have been recorded. In the Medical Research Council Report No. 58,[12] three cases of trinitrotoluene poisoning are recorded where the period between the last exposure to the poison and the onset of jaundice was two months, over seven months, and over nine months respectively. The onset of jaundice from quinoline derivatives (atophan group of poisons) is often delayed for several weeks after the taking of the last dose of the drug.

Toxic jaundice having once set in the condition may persist for months or years, the stools being pale and the urine containing bile. Examples of this have been seen in arsenobenzol jaundice—e.g., in Case 2—where jaundice persisted for five months, yet on post-mortem examination no mechanical obstruction existed; the jaundice had been entirely caused by the toxic hepatitis resulting from the N.A.B. injections.

CASE 9.—A female, aged 30 (?) whose case was kindly reported to me from the Clinical Medical Unit of St. Thomas's Hospital by Dr. R. J. V. Pulvertaft, died from ascites and subacute necrosis of the liver 10 years after jaundice from trinitrotoluene poisoning. The microscopical specimens in this case showed chronic fibrosis of the liver with consequent obstruction to the bile-ducts in the liver, which accounted for the continued jaundice.

As examples of similar cases of biological origin which I have personally examined may be quoted:—

CASE 10.—A man, aged 33, was seen by me on Nov. 4th, 1924, and subsequently. He gave a history of enteritis from 1916 to 1918, in Russia and Mesopotamia during the war. He had had small-pox in 1918, and influenza in 1918, 1919, 1920, and 1921. In August, 1923, jaundice developed. There was no history of alcoholic indulgence or syphilis and the Wassermann reaction was negative. The liver showed smooth enlargement. Bacteriological examination of the stools on Dec. 9th showed infection with *Streptococcus viridans* and *hæmolyticus*. The jaundice persisted in varying intensity until Oct. 18th, 1927, when symptoms of acute hepatic necrosis developed and terminated fatally in three days.

CASE 11.—A married woman, aged 56, had her left breast removed on April 6th, 1927, for carcinoma. There was some pyrexia after the operation and continued until June 2nd when jaundice developed. The case was fully investigated and the only cause found for the jaundice was intestinal toxæmia. The jaundice persisted. On March 2nd, 1928, an exploratory operation was performed, no mechanical obstruction of the large bile-ducts was found, but the patient died from internal hæmorrhage on March 4th.

I could quote many other similar cases under my personal observation where a long persistent deep jaundice has occurred without mechanical obstruction, the jaundice being entirely due to the changes in the liver associated with toxic jaundice.

I am greatly indebted to my colleague Dr. W. D. Newcomb for the preparation of the beautiful

specimens illustrated and for the post-mortem notes. I should also like to express my indebtedness to Mr. John R. Ford for the beautiful and accurate drawings made from the microscopical sections.

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A MALIGNANT TUMOUR OF THE THYMUS GLAND.

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TUMOURS of the thymus gland are somewhat rare, and the following notes may be of interest both on this account and by reason of the difficulty which arose in regard to the diagnosis of the condition during the patient's illness.

History of the Case.

A girl of 20 was admitted to Brompton Hospital on March 4th, 1929, complaining of shortness of breath on exertion, dry cough, and loss of weight. It was difficult to fix the date of the onset of her symptoms. Shortness of breath had been noticed for several years, and had been attributed to anæmia; she had never been able to play strenuous games. At the age of 18, however, she had been medically examined and pronounced healthy. Soon after this she started work as a shorthand typist, and continued in her occupation almost up to the time of her admission to hospital, but for the last four months her dyspnœa had become severe. Her mother had noticed that the least exertion always induced distressing shortness of breath, and the girl was unable to sleep without being propped up in bed. She had attacks at night "as if she were being choked," but these were attributed to "asthma," of which there was a history in the family. The patient herself had, however, expressed the fear that "she had a growth in her throat." She was sent into hospital for diagnosis as a case of suspected tuberculosis of the lungs.

She gave no history of any previous illness, apart from the symptoms recorded above, with the exception of tonsillitis at the age of 13 years.

On admission she was found to be very thin, weighing only 5 st. 12 lb., though 5 ft. 9 in. in height. The mucous membranes were pale, with a tinge of cyanosis about the lips. She was able to walk about the ward without difficulty, but became somewhat breathless if she went any distance. Her temperature in the evenings was about 99° F.; pulse-rate, 80–100; respirations, 20–24 per minute. Her chest moved badly; there was some lack of percussion resonance and fine râles over the apices of the lungs. The cardiac impulse was visible and palpable over a wide area, being especially marked in the second left intercostal space, where a systolic murmur could also be heard. Radiographic examination revealed "a heart enlarged in the transverse diameter, suggesting a mitral lesion; restricted movement of the right side of the diaphragm; apical pleurisy, and coarse mottling of all zones of both lungs." There was also apparent displacement of the trachea to the right, with some narrowing of its lumen. This, however, did not seem sufficient to obstruct respiration, and it appeared necessary to attribute such dyspnœa as existed to disease of the lungs.

The radiographic appearances were not characteristic of tuberculosis, the opacities being small, evenly

FIG. 1.

Radiograms howing compression of the trachea and coarse mottling of the lungs.

scattered, and more numerous in the lower than in the upper parts of the lungs, and no tubercle bacilli were found in the scanty sputum; but in view of the doubt as to the nature of the condition and the presence of marked râles over the apices of the lungs (as the patient was only sent into hospital for a short period for diagnosis and could not be retained for longer observation) it seemed better to send her to a sanatorium where she would be under medical care rather than to let her go home, as her friends otherwise wished. She went accordingly to Pinewood Sanatorium on April 5th, having improved a little while in hospital and gained 6 lb. in weight.

She remained a month at the sanatorium but, as no proof of tuberculosis could be obtained, she came back to the hospital for further investigation.

Her general condition was practically the same as before, but the lack of movement in the chest was more pronounced and the râles had extended all over the thorax. There was now some indefinite fullness at the root of the neck, consistent with enlargement of the thyroid gland, though this could not be clearly outlined. There was no exophthalmos or tremor, and the basal metabolic rate was within normal limits. Two further examinations of the sputum for tubercle bacilli were negative, as was also the Wassermann test. The blood showed 114 per cent. of hæmoglobin and 4,528,000 erythrocytes per c.mm. Laryngoscopic examination revealed nothing abnormal beyond slight reddening of the vocal cords, but the radiological report (May 24th) noted "marked compression of the trachea, and on either side of it a well-defined opacity extending up to the root of the neck—probably thyroid." (Fig. 1.) A further X ray

examination on June 24th showed no more change, the condition in the lungs being practically the same as that on the first examination in April. Dr. Stanley Melville, however, made the suggestion that the appearances were similar to those seen in cases of blastomycosis. A later skiagram showed that there was no anterolateral compression of the trachea.

In view of the radiological appearances and the suggestion that enlargement of the thyroid might be the cause of the tracheal stenosis, an attempt was made under a local anæsthetic to investigate the condition of the gland, with a view to removing, if possible, some portion of it or at least dividing the isthmus in order to relieve pressure. Unfortunately the patient's mental and physical condition rendered the undertaking impossible, and the operation had to be abandoned. A small portion of tissue removed showed only fibrous and muscular structure, with no glandular elements.

The girl's condition gradually deteriorated. Her weight decreased, the dyspnœa became more severe, and she was quite unable to stand or even to sit up in bed without grave distress. She went home on Jan. 23rd, 1930, at her mother's desire. She was readmitted for the last time on August 18th, on account of urgent suffocative attacks. She was now extremely emaciated and definitely cyanotic, having to lie propped up in bed and unable to make the least movement. There was some clubbing of the fingers. The chest was extraordinarily flattened from before backwards, and the whole front of the thorax receded with every inspiration, the lower ribs expanding a little in a lateral direction at the same time. There was no enlargement of the liver and no œdema of the legs or albuminuria. The pulse-rate was 112–124, and the respiration-rate 28–34. She died suddenly in an attack of dyspnœa on August 27th, 1930.

POST-MORTEM FINDINGS.

The body was extremely emaciated. There was no œdema of the legs. No enlarged glands were

FIG. 2.

Drawing showing relative size and position of tumour.

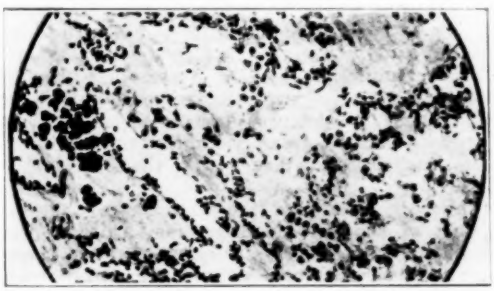
present in the neck. The right lobe of the thyroid gland was much larger than the left. Immediately below the thyroid, but not continuous with it, a firm mass was found which, as will be seen in Fig. 2, was in close relation to the right carotid sheath, and completely surrounded the left carotid sheath. The main bulk of the growth was to the left of the midline, and this portion pressed inwards on the left side of the trachea. On opening the trachea the lumen was found to be markedly stenosed about 1½ inches above its bifurcation. The growth had not, however, infiltrated the tracheal wall.

There were many fine adhesions between the pericardium and the pleura over the apex of the left lung. The right auricle and ventricle were very dilated. There was no valvular disease. The lungs were small and their surface irregularly puckered. They felt indurated, but some portions, especially in the upper lobes, contained air. On section they presented a congested appearance and oozed blood freely, but throughout the lung substance were seen denser areas of varying size, the average being less than half an inch in diameter. These areas felt indurated and airless, and sank in water. This condition was most marked around the hilum and in the lower lobes, where there appeared to be no normal lung tissue present.

The mediastinal glands were not enlarged. The liver was soft, but there was no nutmeg congestion. No secondary deposits were present. The spleen and kidneys appeared normal.

Sections were made from (*a*) the growth, (*b*) from both lungs, (*c*) from a mediastinal gland. We are

FIG. 3.



Section of the tumour. (× 100.)

indebted to Prof. E. H. Kettle for the following report on the sections:—

"The condition is a neoplasm and not an inflammatory or hyperplastic process. I do not think there is evidence that it started in the thymus in the sense that it is composed of specific thymus tissue. The growth contains small calcareous foci (see Fig. 3), but I do not think these represent degenerated thymus corpuscles, but are possibly due to the degeneration of small groups of tumour cells. The dense hyaline stroma suggests a chronic process. As to the actual nature of the growth, I would suggest an endothelioma—derived from vascular endothelium—a hæmangio-endothelioma. Most of the tumour cells consist of little else than small nuclei, but here and there one sees groups of cells which have a definite amount of cytoplasm, and these cells are closely applied to each other. The cells lie in spaces in the stroma in which they are very loosely packed, an arrangement due, I believe, to a primary cell degeneration. I suggest that these cells represent primitive angioblasts which, by a physiological degeneration, tend to produce vascular spaces within their own groups. And I think I can trace this development throughout all its stages in the section."

Pathology of the Tumour.

That the tumour was situated in the thymus is sufficiently proved by its anatomical position and by the presence of normal thymic tissue attached to its lower pole. Probably more of this might have been found elsewhere if the growth had been thoroughly examined and not preserved practically entire, as it was, for the hospital museum. Its malignancy was indicated by the secondary deposits in the neighbouring glands and in the lungs. As it was not apparently composed of thymic elements, it should perhaps be described as *in* the thymus rather than *of* it.

Tumours of the thymus seem to have been first described by Friedleben in 1858, and were well known to Virchow, who noted that the gland was often the starting-point of lymphosarcoma (Voges [1]). Simple tumours, such as fibroma and myxoma, are said to occur in it, and also cysts of various kinds, both developmental and dermoid (Ewing [2]). Lipoma of

the thymus is a pathological curiosity; two cases are noted by Yamanoi,[3] and a unique case of mixed tumour (cystadeno-chondrosarcoma), analogous to those met with in the parotid and testicle, was described by Rolleston.[4] Mandelbaum and Celler described a case of tumour which they regarded as a "perilymphatic lymphangio-endothelioma" (Bell [5]). Statistical knowledge of tumours of the thymus practically dates from a paper by Rubaschow (1911), who collected 69 cases. Of these 52 were classed as sarcoma and 12 as carcinoma, with 5 doubtful. Among the sarcomata, lymphosarcoma largely predominated (26 cases being called lymphosarcoma or lymphoma), the remainder including round-celled, spindle-celled, and mixed-celled growths, and one specimen described as sarcoma cavernosum. Two of the sarcomata (recorded by Letulle) were called lymphadenoma, a matter of interest in view of the division of lymphosarcomata by Symmers and Vance [6] into (1) a variety consisting of masses of lymphoid cells, separated by strands of connective tissue (apparently the kind of growth usually described as lymphosarcoma); and (2) tumours histologically resembling Hodgkin's disease, containing giant-cells and eosinophil elements. Gandy and Piédelièvre [7] describe as lymphadenoma a growth which actually infiltrated neighbouring parts, including the heart and the superior vena cava.

The carcinomata of the thymus have been the subject of considerable discussion, as they present peculiar characteristics. Rubaschow noted that one form of cancer may be ill-defined and closely resemble sarcoma, while a second variety takes the form of ordinary "medullary" carcinoma. Other writers speak of small-celled and large-celled varieties of carcinoma of the thymus, and a form of tumour special to this gland (also found in the tonsil) is the so-called lympho-epithelioma, which exhibits a reticulum of epithelial cells containing within its alveoli masses of lymphoid elements. As consisting of the two forms of cells met with in the normal thymus, epithelial and lymphoid, this form of growth may merit the name "thymoma," which has been loosely applied to different forms of growth originating in the gland, including the lymphosarcomata. Pure epithelial tumours or epitheliomata are said to be the rarest form of thymic growth. Symmers and Vance [6] state that only four cases are on record, including one of their own. A case reported by Strauss,[8] not included in their list, is called "squamous carcinoma." Foot and Harrington [9] add a further case which they prefer to term "thymic epiblastoma." Zajewloschin,[10] who attributes the division of carcinomata into small-celled and large-celled varieties to Schmincke, notes that the former were called sarcomata by Letulle; on the other hand, Davidson quotes the recent view of Barnard that many of the tumours in the mediastinum called lymphosarcomata are in reality a form of carcinoma. The only conclusion possible appears to be that the classification of tumours according to their histological appearances is at present unsatisfactory, and that those arising in the thymus, owing to its peculiar histological structure, present peculiar difficulties.

A search, throughout such medical periodicals as were available to us, for cases of tumour of the thymus recorded in the last 12 years (1919–30) does not bear out the relative proportions of the different growths met with by Rubaschow. Possibly more attention has been devoted recently to the carcinomata, as being rarer and so of greater interest; or perhaps, more probably, the basis of classification has changed, many growths previously regarded as lymphosarcomata being now called lympho-epithelio-mata. Be that as it may, of 43 instances of which we find adequate records 29 were (so far as we can judge) carcinomata and 14 sarcomata, 10 of the latter being lymphosarcomata. Of the carcinomatous tumours 12 were apparently lympho-epithelioma, 13 were described simply as carcinomata, and 4 as epitheliomata. The various authors themselves seem to find the differentiation difficult, and the descriptions given are not always easy to follow. The numbers must therefore be regarded as only approximate. Further, we cannot regard the classification itself as free from doubt, in view of the nature of our own specimen, which at first sight definitely suggested a carcinoma and which was so regarded by several pathologists who kindly looked at our sections. The true nature of this tumour was only determined after careful study by Prof. E. H. Kettle, who has devoted much attention to growths derived from the vascular endothelium. It seems not impossible that some of the tumours previously called carcinomata were in reality of the same nature.

Large multinucleate cells resembling giant-cells, and masses like syncytia, have been found in epithelial as well as in sarcomatous tumours of the thymus. Calcification is also commonly found, as in our own specimen. Hassall's corpuscles may or may not be present; their absence does not negative an origin in the thymus gland.

Metastases occur most frequently in the neighbouring lymphatic glands, in the pleuræ, and in the lungs. They may, however, occur at a distance, and have been found in the abdominal glands, the liver, the kidneys, the suprarenal bodies, the stomach, the ovary, and rarely in the bones. They may resemble the parent tumour in containing Hassall's corpuscles and areas of calcification. In one instance the thyroid gland was the seat of a secondary deposit (S. E. Brown [11]).

Symptomatology.

It is not very rare for a tumour of the thymus to be found unexpectedly at necropsy, having given rise to no symptoms during the patient's life. In most cases, however, there is dyspnœa of increasing intensity, often paroxysmal in character, along with cyanosis and œdema of the neck and face, due to pressure on venous trunks. The vena cava superior may be compressed or even penetrated by the growth; the bronchial vessels may also be involved, with resulting hæmoptysis, and in one case a bronchus itself was obstructed by growth. Pleurisy with effusion is not uncommon, and the fluid may be hæmorrhagic; pneumothorax has also been encountered. The pericardium may be involved in the tumour, and even the muscle of the heart may be invaded.

Radiographic examination generally shows a dense shadow extending outwards on either side of the manubrium sterni and downwards into the thorax. In rare instances metastases have given rise to the most prominent symptoms. Thus in one instance enlarged abdominal glands gave rise to a diagnosis of abdominal tumour, and in another, in which the spine was the seat of secondary growth, a paraplegic condition occurred before the primary disease was recognised. A remarkable instance of thymic lympho-epithelioma in which there were metastases in the brain and choroid plexus was recorded by Danisch and Nedelmann,[12] the patient being a child aged 3½ years. A still earlier case is described by Bedford [13] in a new-born baby, the carcinomatous growth causing death by asphyxia, with metastases in the

lungs, liver, bones, and skin, these last being indicated by a cutaneous eruption during life.

It is usually stated that sarcomata occur in young patients and carcinomata in older subjects, but the above instances show that the rule is far from absolute. Foot and Harrington [9] also met with an epithelial tumour in a female child aged 2 years. Among the cases which we have collected there were 18 instances of carcinoma in persons over the age of 40, and ten below that age. The sarcomata were more evenly distributed, there being three in the first decade of life, two in the second, three between 21 and 30 years of age, and three between 31 and 40, the remaining two being in persons aged 60. The association of thymic tumours with other diseases is of interest. Friedlander and Foot [14] recorded a case of small round-celled sarcoma in a woman of 38, accompanied by lymphatic leukæmia; they infer that the growth must have been a lymphosarcoma owing to this association—possibly a doubtful argument. The question of the relationship between enlargement of the thymus and this form of leukæmia is discussed by Major,[15] who mentions that Lochte described an "epithelioid transformation" of the gland in acute cases. Bell [5] collected a series of cases of thymic tumours occurring in patients suffering from myasthenia gravis, most of which he regards as having been benign in character, though they were not always so described by the original authors, the lymphorrhages characteristic of myasthenia having been sometimes mistaken for secondary deposits of sarcoma. One case, however, in his series was a genuine round-celled sarcoma with secondary growths in the pleura and diaphragm. An association of thymic tumour with tuberculosis was noted in two instances, but must probably be regarded as accidental. A previous history of attacks of tonsillitis, such as occurred in our own case, is given in the case described by Friedlander and Foot,[14] and Foot and Harrington [9] in another case found the tonsils hypertrophic. In a case reported by Ewing, repeated attacks of tonsillitis had occurred. In view of the frequency of tonsillar inflammation the association in these patients was probably accidental, but the close resemblance in histological structure between the tonsil and the thymus, and the occurrence of lympho-epitheliomata in both these organs, render the association worthy of note.

Diagnosis.

In most cases of thymic tumour the radiographic appearances, along with dullness on percussion over the upper part of the sternum, dyspnœa, and venous engorgement, will enable a tentative diagnosis of the condition to be made. In our own case the diagnosis was rendered difficult by the small size and limited central position of the neoplasm, and by the absence of any marked fullness of the veins. Probably, if the idea of the thymus as the possible seat of trouble had been present in our minds, it would have been considered as a possible explanation of the symptoms. The original diagnosis of tuberculosis of the lungs was rather a matter of convenience than an act of faith, but we find that the same initial error of judgment was made in a case reported by Brannan.[16] The stenosis of the trachea seen in the X ray plates never seemed adequate to explain the degree of dyspnœa from which the patient suffered, and indeed even at the necropsy there seemed a sufficiently wide lumen to the trachea to admit of quiet respiration. Possibly during life, when the parts were full of blood, the degree of narrowing was greater than it appeared post mortem; or perhaps more probably the growth was drawn into the upper aperture of the thorax at each inspiration and acted as a ball-valve, so as to impede the entrance of air. The patient was seen by many physicians during her stay in hospital, and the favourite diagnosis was that of adhesive mediastinitis, with consequent indrawing of the chest walls. The shrinkage of the lungs and consequent exposure of the heart behind the sternum were recognised clinically, but the extreme degree of fibrosis of the lungs was not suspected. Indeed, we do not remember to have seen in any other case so advanced a condition of bilateral fibrous induration and airlessness, or such extreme approximation of the anterior wall of the thorax to the vertebral column and back of the chest.

Treatment and Prognosis.

Lenz [17] records a case in which an epithelial tumour of the thymus was successfully removed by operation and the patient recovered. In our own case this would have been quite impossible, owing to the way in which the neoplasm had grown round the arterial stems, and a similar embedding of the great vessels was noted in the great majority of recorded cases. Instances are reported in which thymic tumours disappeared under treatment with radium or X rays, but in such cases it is impossible to be sure of the nature of the condition. Apart from such means of treatment, the outlook is, of course, hopeless, but the duration of life after the onset of symptoms varies very greatly. Kneringer and Priesel [18] record the case of an old man, aged 71, in whom the disease had apparently lasted for over eight years; on the other hand, a child of 9 years died in 26 days (Miller [19]). A duration of two years is not very rare, but the majority of patients die within a year of the onset of symptoms. In our own case the disease seems to have been present for "several years" before the girl came into hospital, and the tumour must have already attained a considerable size nearly two years before admission when she was conscious of a lump in her throat. It was clearly a slowly growing formation of low malignancy, as indicated by the dense hyaline fibrous stroma, the small amount of glandular infection, and the absence of any visible changes in the pulmonary metastases during the time she was under observation.

Our thanks are due to Prof. Kettle for his kind help and advice; also to Dr. E. E. Atkin, director of the pathological department at Brompton Hospital, for his trouble in preparing sections for examination and mounting the specimen.

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THE INCIDENCE OF OSTEOMALACIA AND LATE RICKETS IN NORTHERN INDIA.

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THE inquiry of which the results are summarised in this paper was carried out under the Indian Research Fund Association.

The ætiology of osteomalacia has roused considerable interest during the last two decades. A survey of recent work [2] suggests that osteomalacia is a true deficiency disease and that its ætiology is the same as that of early and late rickets, the clinical differences being due to a different physiological condition of the bone.

Rickets and osteomalacia are rarely noted in India south of Bombay and Calcutta; the cases on which this report is based were drawn from urban and rural areas in northern India and Kashmir. Four hundred urban cases of late rickets and osteomalacia were kept under observation at special clinics in Lahore, Amritsar, and Simla. Occasional rural cases of rickets and of osteomalacia associated with maternity were seen personally or recorded by doctors and health visitors among village girls and women in the northern Indian plains. Cases were reported among Pathan women of the nomadic *powindah* tribe in the North-West Frontier province, and among Mohammedan women in Kashmir villages. A very high incidence of rickets and osteomalacia was found at all ages, in both sexes, among Hindu field workers in the hilly Kangra district, and a household survey was carried out in a village of this area. The survey of the incidence among children of school age (5-17 years) included observation of children in certain industrial areas as well as of over 2000 children attending school in towns and in country districts.

TABLE I. and IA.—*Factors Influencing the Onset in 400 Cases of Late Rickets and Osteomalacia, from Clinics at Lahore, Amritsar, and Simla.*

Race.	M.	F.	Onset before union of epiphyses. Late rickets.		After Ep. U.*
			Age in years.	Cases.	
Hindu (Brahmin, Rajput, Kayasth, Jain, Khatri, Bania, Arora, Chumar, and Mehter)	5	204	5–10	33	
Mohammedan (Sayed, Punjabi, Hindustani (U.P.), Kashmiri) ..	1	150	10	18	
Sikh	—	29	11 12	14 25	
Indian Christian ..	—	11	13 14 15 16	29 34 32 41	
	6	394	—	226	174

* After Ep. U. = Onset over 17 years, after epiphyseal union osteomalacia.

TABLE IA.

Relation of onset to marriage	Before	148
	After	252
Associated with pregnancy, lactation, or abortion		218
Associated with illness: fever, 4; pneumonia, 3; cholera, 2; intestina infection, 2; small-pox, 2; disability after accident, 2; measles, 1; abdominal tuberculosis, 1		17
Deficient	Sunlight (housing and purdah). (A familial incidence was observed in 100 cases where sun or diet were very deficient)	240
	Diet	160
Social condition of family	Poor (coolies, menial workers)	209
	Fair (storekeepers, mechanics, clerks)	174
	Good (merchants, lawyers, officials)	17

Race, Sex, and Mode of Onset.—No race in northern India is immune, but rickets in its various forms—osteomalacia, late rickets, and infantile rickets—is more prevalent in certain castes owing to their mode of life. Under normal Indian conditions the men and boys of a family obtain adequate sunlight and the best of the available diet, so that rickets is rare among them except in conditions of extreme deficiency of diet or sun, as in the Kangra district and in carpet works at Amritsar. The disease is chiefly met with among girls and women during adolescence and maternity (marriage often takes place at the onset of puberty). The incidence of infantile rickets is fairly equally distributed between the sexes. In this series of cases it was rare for the children (all breast-fed) born of osteomalacic mothers to show clinical signs of rickets until their second year; one case of fœtal rickets was reported. The onset of late rickets and osteomalacia, which is often insidious and characterised by intermissions, was found to occur at any age from 5 to 54 years; many cases date from ten years upwards in association with adolescence and maternity (Table I.).

Lines of Investigation.

URBAN.

The housing conditions in crowded areas are such as afford scant opportunity for obtaining much sunlight, and the Indian girl or woman rarely ventures any distance from her home. Observations on the intensity of the ultra-violet solar radiation made by various observers, using Hill's acetone methylene-blue gauze in different Indian towns, give readings in units per day varying according to the season from 3 to 12. These readings are for exposure in the open; in the small dark room which is the poorer city woman's home the results of exposure are nil. Many urban Hindus have only small quantities of milk and fats, ghi (i.e., clarified butter) or vegetable oils, in their diet, which consists chiefly of cereals and cooked vegetables; they do not observe purdah, and derive such vitamin D as they get mainly from exposure to the sun. Mohammedan girls begin to observe purdah from 7 to 10 years of age onwards, and thenceforth have even less opportunity of obtaining vitamin D from the sun. Thus, although the diet of the Mohammedans contains some animal fat and is rather more balanced than that of the Hindus, their mode of living leads to even more deficiency in vitamin D. These diets usually contain an adequate amount of vitamin B, but an excess of cereal plays some part in rendering the condition of the patient worse.

A study of conditions in Ludhiana is instructive. In this town careful inquiry by doctors and health visitors over a period of two years could only disclose five indigenous cases of rickets and osteomalacia. It was found that the diet of the average household did not differ materially from that of women in Amritsar city, where the incidence is high, but in Ludhiana overcrowding was absent and each house received plentiful sunlight, which even those observing purdah could enjoy in open courtyards.

The constituents of the diet of 265 girls and women attending the special clinics were considered in detail, and their symptoms classified according to the degree of severity (Table II.).

Treatment consisted of the administration of some form of vitamin D (cod-liver oil containing that vitamin, or an irradiated substance such as Ostelin or Vigantol, for patients who disliked the use of animal oil), combined with the daily use of milk

TABLE II.—*Relation of Lack of Vitamin D to Severity of Clinical Symptoms.*

Diet.	Clinical symptoms.			Total cases (265).
	+++	++	+	
I. Absolute lack of vitamin D..	29	44	12	85
II. Partial lack of vitamin D ..	11	70	71	155
III. Fairly adequately compensated for vitamins D, A, and C	3	2	15	20
IV. Border-line diets (with regard to vitamin content) ..	—	2	3	5

(not less than 8 ounces), fresh fruit or greens, and sunlight (at least two hours out of doors, with as much direct exposure of the skin as practicable), and massage of the affected parts.

Of the patients treated, 244 attended the clinic regularly for six weeks, and the improvement in their condition was shown by diminution of pain and of muscular spasm with consequent lessening of deformity. Many cases were controlled by X ray examination. The remaining 21 cases did not return for treatment (Table III.).

TABLE III.—*Amelioration of Symptoms After Treatment.*

Diet.	Clinical symptoms.				Total cases (244).
	+++	++	+	−	
I.	—	8	45	23	76
II.	—	22	44	77	143
III.	—	—		19	20
IV.	—	—	—	5	5

Observations were made on the value of the different factors in treatment on 41 girls and women, cases of late rickets and osteomalacia of moderate or severe degree, and the results were controlled by repeated X ray examination. Patients continued to live in their own houses but attended the clinic regularly for at least three weeks, and many were kept under observation for two to five months. They were divided into five groups and treated respectively by the addition of (1) diet (milk and fruit), (2) sun (two hours' exposure daily), (3) vitamin D alone (full dose), (4) diet+sun, (5) sun+vitamin D. Each factor added was partaken of under supervision for a period of three weeks.

The results indicate the importance of food values and a balanced diet in treatment.

Group I., ten patients, all put on weight, although seven of them, who were very poor and living under most unfavourable conditions, had no lessening of pain or spasm. After the three weeks of observation were completed they very rapidly improved on the addition of vitamin D. The remaining three patients belonged socially to the middle class, lived amongst much more favourable surroundings, and were in the habit of obtaining sunlight; their symptoms improved so much that it was unnecessary later to supplement treatment with vitamin D.

Group II., five patients, all wives of industrial workers on small wages having a very unbalanced diet, showed no obvious improvement, but when, after three weeks' treatment, vitamin D was added, their symptoms cleared up slowly.

Group III., twelve patients, improved slowly under treatment.

Group IV., seven patients, improved slowly under treatment.

Group V., seven patients, improved under treatment considerably more rapidly than Group III.

Massage or galvanic baths are useful in easing pain; exercises are also helpful. Indirect ultra-violet irradiation can, if necessary, be substituted for exposure to sunlight. Experiments have been made with the use of Indian fish oils, and also attempts to get irradiated substances manufactured on a commercial scale in India, but so far unsuccessfully.

RURAL.

In the Kangra district the population in proportion to the cultivated area has reached a limit already exceeding the capacity of the country to support it. A household survey was carried on in a village called Launa (altitude 4300 feet). The inhabitants are field workers and accustomed to open-air life. Plentiful sunshine is available for eight months in the year; in the remaining four there are rains and mist, and during this period patients state that their pains are worse. Village families fall into three groups: chumars, the lowest social class in the village, in which the men and women are field workers on other people's land; zemindars, usually cultivating their own land; and Gurkhas, the families of military pensioners (Table IV.).

TABLE IV.—*Rickets and Osteomalacia among Inhabitants of Launa Village, Kangra District. Relation of Caste, Sex, Age, and Diet to Severity of Clinical Symptoms.*

Average daily diet.	Age under 17 years. Rickets.			Age over 17 years. Osteomalacia.			Total cases.
	Clinical symptoms.						
	+++	++	+	+++	++	+	
I. Chumar (109 persons examined).							
Milk, −; dal, 2 oz.; fruit, −; rice, ¾ lb.; cooked vegetables, rarely; ghi, ½ oz.; atta, ¾ lb., +vegetable oil	M. —	6	16	1	7	10	40
	F. 2	3	12	11	11	4	43
II. Zemindar (47 persons examined).							
Milk, −; dal, 2 oz.; fruit, −; rice, 1 lb.; cooked vegetables, every third day; ghi, ½ oz.; atta, ¾ lb.; extra oil used for cooking	M. —	—	8	—	—	—	8
	F. —	1	4	—	2	1	8
III. Gurkha (13 persons examined).							
Milk, 4 oz.; dal, 1½ oz.; fruit, occasionally; rice, 8 oz., cooked vegetables, daily, ghi 1 oz.; atta, ¾ lb.; meat every third day; extra oil used for cooking ..	M.	Nil.		Nil			Nil
	F.	"		"			"

M. = male; F. = female.

The addition of vitamin D, together with milk and fruit, daily to the diet caused rapid improvement in the condition of 27 cases; it is, however, impossible for these patients to continue such diet on their own earnings (Table V.).

Since the Kangra district lies in the Himalayan tract, goitre is prevalent, but it does not occur more frequently among cases of rickets or osteomalacia, nor does their improvement on treatment cause any

decrease in the goitre. Goitre is rarely present among urban or rural cases in the plains.

TABLE V.—*Ameliorating Symptoms among Chumar Women and Girls of Launa Village.*

—	Age under 17 years. Rickets.				Age over 17 years. Osteomalacia.				Total cases.
	Clinical symptoms.								
	+++	++	+	−	+++	++	+	−	
Before treatment..	2	3	—	—	11	11	—	—	27
After treatment ..	—	—	1	4	—	—	8	14	27

Examination of Children of School Age.—Rickets was associated with lack of sunlight in overcrowded schools, and also with deficient diet in industrial areas (Table VI.).

TABLE VI.—*Incidence of Rickets among School-girls (Ages 5 to 17 Years) in Lahore.*

Classification of schools.	Girls examined.	Cases of rickets.
1. Intramural congested city ..	783	422
2. Extramural city	415	135
3. Well-planned suburban ..	284	50
Total	1482	607

Summary.

A high incidence of rickets and osteomalacia was found in overcrowded cities and in towns with narrow lanes and high sunless houses, or in densely populated bazaars among Hindu and among purdah-observing Mohammedan women and girls. The diet of such patients was found to be deficient in vitamin D and in certain cases in vitamins A and C also. In rural areas, when diet is markedly deficient, adequate sunlight cannot prevent rickets or osteomalacia.

Investigation of the diet, housing, and customs of over 1500 cases of rickets and osteomalacia in northern India shows that a consistent lack of vitamin D in connexion with diet and lack of sunlight is an ætiological factor, thus confirming the experimental findings in various parts of the world. Improvement in diet causes but little improvement in symptoms if sunlight is deficient; conversely the provision of sunlight for cases on very deficient diet is of little use. The results of treatment show that cases on full doses of vitamin D improve gradually, but in order to get more rapid results it is advisable to combine the use of a moderate dose of vitamin D with daily exposure to sunlight and an improved diet (i.e., the addition of vitamins A and C). There is also much value in thus training patients in a better mode of life.

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ACUTE ASEPTIC MENINGITIS.

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AT the present time there are appearing throughout the world an increased number of unusual, little understood, infections of the central nervous system, such as post-vaccinal encephalitis and diffuse encephalomyelitis. In view of this we should like to call attention to another type of case which is apparently becoming commoner in this country and which has recently appeared in small epidemics on the Continent, especially in Germany and Scandinavia. It closely resembles tuberculous meningitis—in fact, this is the diagnosis confidently made in practically every case—and since the prognosis is absolutely good, the differential diagnosis is obviously of great importance.

Nomenclature.

The cases show an extraordinarily similar onset and course, and this is one of the main features of this disease which we have termed "acute aseptic meningitis." It is not a new disease. Cases of this type have long been known and described under various terms—benign aseptic purulent meningitis (Schiff[1]), acute idiopathic benign serous meningitis (Andersen and Wulff[2]), epidemic meningitis serosa (Eckstein[3]), acute aseptic meningitis (Gunther[4]), &c. In the absence of more definite knowledge this last name seems the best. At present it is not known if all the cases have a similar ætiology; it is possible, even probable, in spite of the uniformity of the clinical picture, that they have not.

The cases are called "aseptic meningitis," since no organisms have yet been found in the cerebro-spinal fluid. The "serous meningitis," so well-known to otologists, at first sight seems to be something of the same nature—the early stage of a definite meningitis due either to some organisms of low virulence or to organisms as yet remote from the meninges. The increase in cells and protein indicates that the inflammatory process is just reaching the subarachnoid space: in the serous meningitis complicating otitis media these cells are lymphocytes at first, to be superseded by polymorphs later when the inflammation is extending. The onset is subacute, and the clinical picture reaches its climax slowly; then the signs either slowly disappear or a frank meningitis gradually develops. It is easy to visualise here the gradual invasion of the meninges by pyogenic organisms, a mild pyogenic meningitis which the body overcomes. In aseptic meningitis, however, we are faced with a dilemma; the uniformly abrupt, even fulminating, onset, and the severity of the clinical picture seem to indicate an infecting organism of high virulence, yet the short course and rapid regular recovery and the absence of any known organisms in the cerebro-spinal fluid are all against this. The change during the course of the disease from a predominance of lymphocytes to polymorphs in the cerebro-spinal fluid never occurs in aseptic meningitis: either lymphocytes are found in excess throughout the whole illness, or polymorphs predominate at first and there is a lymphocytic predominance later.

Acute aseptic meningitis has the following characteristics for its definition:—

1. An acute onset with definite meningeal signs.
2. Meningeal changes in the cerebro-spinal fluid; there is an increase of pressure and of cells—but the fluid is sterile on culture.

3. A uniform clinical symptomatology.
4. A relatively short benign course without secondary complications.
5. No epidemiological connexion with any known infectious meningeal disease.
6. There is no local infection, such as otitis media or sinusitis.

History.

Sporadic cases answering to the above definition have long been known, and it is highly probable that many of the cases published as healed tuberculous meningitis are of this type. The records of many of these cases are now too old or too incomplete to be of much value.

In 1910 a small series of 14 cases were reported in Paris under various names: Laubry and Foy,[5] syndrome meningé avec lymphocytie rachidienne d'origine indeterminée (3 cases); Rist and Rolland,[6] méningite benigne d'allure épidémique (5 cases). These cases were absolutely typical. At the same time Guillain and Richet [7] published four cases of benign lymphocytic meningitis complicated with jaundice; and Rist [8] showed that many cases of benign infectious jaundice were occurring simultaneously in the Paris hospitals. The jaundice was of the obstructive type—excess of bile in the serum and urine, and no bile in the stools—and the liver was slightly tender but not enlarged. This was accompanied by mild fever, severe headache, and a marked lymphocytic reaction in the cerebro-spinal fluid, but few signs in the central nervous system. Blood examination in one case showed a leucocytosis of 30,000, 93 per cent. of which were polymorphs. No jaundice, however, has been noticed in any case reported since 1910. These earlier case reports have been well reviewed recently by Roch, Martin, and Monedjikova,[9] and will not be dealt with here, since they present no unusual features.

From 1910 to 1925, little or no mention is made of acute aseptic meningitis, and then Wallgren,[10] in a paper entitled, A New Infectious Disease of the Central Nervous System, described a small Swedish epidemic of 19 cases. His cases also were typical.

Symptoms.

The onset is very acute with definite meningeal signs, the previous health being usually quite good; occasionally there is malaise for a few days, but as a rule there are no abnormal symptoms. Suddenly the patient becomes very ill, most children being so ill that they are thought to be in danger of their lives. The most common meningeal signs are headaches, which are severe and mostly occipital, vomiting, and stiff neck; pains in the neck and limbs are often severe, and there is intractable insomnia. Spinal signs are frequent: in bad cases there is marked rigidity of the back and stiffness of the neck, and the patient lies in a meningeal position; in the milder cases rigidity is only shown by a positive Kernig or Brudzinski's sign. The patient is extremely sensitive to movement and the reflexes are everywhere very active. Cerebral signs are much less marked; consciousness is usually not affected, and lethargy is never seen. There is marked dermographism. Convulsions are uncommon except in very young children. If the child is young enough, the fontanelle is found to be bulging. Teeth-grinding is often noted as a symptom. Eye signs are frequently found, the commonest being nystagmus, squint, and photophobia. Papillœdema has been noted in some cases, also hæmorrhage into the fundus (Eckstein [3]), and in some the pupils are unequal and react sluggishly to light. Apart from a facial palsy, which is rare, the cranial nerves are normal. Haessler, Eckstein, and others emphasise the fact that most of the children have sore-throat or severe nasopharyngitis, from which hæmolytic streptococci can be cultured. Some have ulcerative stomatitis.

The abdomen is usually retracted, with active reflexes, and there is no enlargement of the spleen or liver; constipation is the rule. No physical signs are found in the respiratory tract. Some authors mention a slow pulse, but this is not constant.

At the onset *fever* is usually high, continuous, or remittent, while a few of the reported cases are subfebrile. The duration of fever is short—from 3–13 days, averaging seven days. In the rapid cases it falls by lysis after the first few days, while in the stormy cases, after the fall, there may be a recurrence of intermittent fever for a few days.

Cerebro-spinal Fluid.

On lumbar puncture the cerebro-spinal fluid is found under pressure, sometimes markedly increased. The fluid is clear or sometimes cloudy; in a few cases reported it was purulent. In three of Eckstein's cases there was a definite spider-web clot. The cells vary in number, from 60 to a maximum of 1500 being reported; the average case shows about 100–250 cells. These are mainly lymphocytes, but at the onset of the disease polymorphs may predominate, to be replaced by lymphocytes later, this change often being quite rapid. In one case of Laubry and Foy the cells in the cerebro-spinal fluid were as follows:—

		Per cent.			Per cent.
March 17th ..	Polymorphs	95 ..	Lymphocytes	..	5
,, 18th ..	,,	90 ..	,,		10
,, 20th ..	,,	35 ..	,,		65
,, 23rd ..	,,	10 ..	,,		90

A typical case illustrating this transition is reported by Schiff.[1]

Baby of 11 months, admitted on March 28th comatose, with fever, bulging of the fontanelle, and a marked stiff neck. Kernig's sign was positive and both plantar responses were extensor. Pirquet test positive. Pupils and cranial nerves normal. Marked dermographia; retracted abdomen. Urine normal. Blood count: 16,000 leucocytes, of which 41 per cent. were lymphocytes, 50 per cent. polymorphs, and 7 per cent. monocytes. Lumbar puncture produced purulent fluid under pressure; numerous polymorphs, but very few lymphocytes. No clot; no tubercle bacilli; no organisms seen or cultured. Protein + +. "Sugar reaction" negative.

April 1st: Clinical condition unchanged but now more lymphocytes than polymorphs in the cerebro-spinal fluid.
3rd: Temperature 103°. Stiff neck more marked; restless, sleepy, and rolling the eyes about.
April 8th: Well and playing in bed. No signs of disease in the nervous system; cerebro-spinal fluid clear.
April 21st: No increase of cells in the cerebro-spinal fluid.
Examined three years later, entirely normal.

In Andersen and Wulff's cases [2] reported from Denmark, 27 cases showed exclusively or mainly lymphocytes; in two cases there were an equal number of lymphocytes and polymorphs and in three cases polymorphs predominated, the actual counts being 150/3, 3100/3, 165/3. In the last case the cerebro-spinal fluid later in the course of the disease showed mainly lymphocytes, the actual figure being 1500/3. (Andersen and Wulff consider that these last cases must be considered as acute aseptic meningitis since the clinical course was entirely similar. I shall refer to this later in dealing with differential diagnosis.)

The protein in the cerebro-spinal fluid is increased, Pandy's reaction being always positive. The sugar content is normal, varying from 0·03 to 0·06 per cent. The cerebro-spinal fluid, cultured aerobically and anaerobically many times by different observers, has always been sterile; no tubercle bacilli are found, and guinea-pig tests have always been negative.

Eckstein [3] gave suboccipital injections of fresh cerebro-spinal fluid, proved sterile, from cases of aseptic meningitis, to three apes. One ape after three days developed fever and ataxia; the cerebro-spinal fluid was examined three times and showed a polymorphonuclear leucocytosis changing later to a lymphocytosis. The fluid was sterile on culture. Eighteen days after the injection the animal was killed, and severe histological changes were found in the central nervous system—perivascular infiltration, necrosis, and glial proliferation of the midbrain and medulla.

Prognosis.

All cases are discharged from hospital well and in spite of severe general symptoms recovery is rapid and complete. On examination three to five years later no sequelæ are found. There are no residual paralyses, no hydrocephalus, no mental changes, and no recognised encephalitic sequelæ. Such is the opinion of the majority of authors, but Andersen and Wulff have shown that sequelæ do occur, though rarely, and in view of the vexed question of ætiology, it seems worth while to give brief notes of these cases.

CASE 1 (Andersen and Wulff).—Girl of 10, a typical case of aseptic meningitis with a markedly positive Pirquet reaction. Seen six years afterwards, she had had two definite attacks of grand mal and several short fainting attacks. No headache, no diplopia, mentality normal. The fundi showed papilloedema, swelling of 1 D in the right eye, 2 D in the left. No hæmorrhage in the fundus; normal fields of vision. Extensor plantar response right and left. An X ray of the skull showed two calcifications of irregular structure in the posterior part of the brain, one in each hemisphere, apparently situated near the lateral ventricles. On re-examination six months later there had been no more attacks. The right disc was sharply limited and the vessels somewhat tortuous; the left disc showed 1 D of swelling. No hæmorrhage or exudate. No sensatory changes. No chorea, tremor, athetosis, or rigidity. Meningeal process apparently subsiding. Diagnosis: ? Tuberculomata.

CASE 2.—Boy of 13, a typical case with fever of 5 days' duration. Re-examined two years later, definite psychic changes had developed since discharge from hospital, the boy being sometimes exalted, sometimes depressed. He complained of fainting and attacks of headache and there was a tendency for him to drop things. The eyes were normal, except for slight exophthalmos. The genitalia were infantile, and there was little pubic hair. Radiography of the skull showed nothing abnormal. In this case probably the endocrine system is involved.

Another of Andersen and Wulff's cases ran a fairly typical course, and on re-examination three years later showed definite moral insanity, but here the meningeal signs came on 14 days after vaccination, and so cannot be included under our definition of acute aseptic meningitis.

Epidemiology.

Small epidemics of acute aseptic meningitis have been reported in different parts of Europe recently. Wallgren [10] saw 19 cases in Sweden in 1922. Haessler [11] in Leipzig had 12 children with it between July and September, 1928. Eckstein [3] reports 13 cases admitted to the Düsseldorf Children's Hospital between May and October, 1930; six of these cases were from one district, two of which were relatives, and two children had attended the same class at school. Their ages varied from 10 months to 12 years.

Relationship to Other Nervous Diseases.

1. *Poliomyelitis.*—Many authors have thought that acute aseptic meningitis is nothing more than a meningeal form of acute poliomyelitis. Gunther [4] showed that the cases definitely occur in the autumn, while Wallgren [10] has described cases of proved poliomyelitis in which at the onset there is a marked predominance of polymorphs in the cerebro-spinal fluid with a transition to lymphocytes later on. Antoni (quoted by Wallgren) has actually described a family in which one child had poliomyelitis while another had acute aseptic meningitis. In spite of this evidence, however, the case against the identity of the two diseases seems overwhelming. The most important points are: (1) In the Paris epidemic of acute aseptic meningitis in 1910 and in the Stockholm epidemic there was no epidemic of poliomyelitis. (2) No flaccid paralysis has ever occurred after the attack. (3) In acute aseptic meningitis there is an extraordinary uniformity of symptoms, while in poliomyelitis the degree of severity differs greatly from case to case.

2. *Tuberculous Meningitis.*—At the onset this is the usual clinical diagnosis made, and to the surprise of all concerned the child recovers. Tubercle bacilli are never found in the cerebro-spinal fluid, and guinea-pig tests are always negative. The course of the disease is favourable with absolute regularlity. But could this clinical picture be caused by an attenuated tuberculous infection? Several patients have a very suggestive tuberculous history; for instance, Wallgren [10] had a patient with mediastinal gland tuberculosis (X ray diagnosis) and a positive Pirquet reaction who developed aseptic meningitis. The case quoted above also might be due to tuberculomata with a few tubercle bacilli leaking into the meninges.

3. *Cerebro-spinal Meningitis.*—Cases with cerebro-spinal fluid persistently sterile, containing an excess of polymorphs, are well known in cerebro-spinal meningitis, but as far as we could determine in the literature there is never a transition to a lymphocytosis. No sequelæ, such as hydrocephalus, occur in acute aseptic meningitis.

4. *Syphilitic Meningitis.*—Other manifestations of syphilis are not found, and the Wassermann reactions in the blood and spinal fluid are always negative.

5. *Encephalitis Lethargica.*—In this disease the spinal fluid is clear and contains an excess of lymphocytes, although polymorphs can occur. In acute aseptic meningitis, however, sequelæ are very rare (The only two reported cases are quoted below under the heading of prognosis); epidemics of acute aseptic meningitis and encephalitis lethargica do not apparently coincide.

6. *Mumps.*—A well-known lymphocytic reaction in the cerebro-spinal fluid occurs in this disease, sometimes preceding the swelling of the parotid glands. Weissenbach, G. Basch, and M. Basch [12] report several cases of this type, the characteristics of which are the appearance of the parotid swelling, sometimes unilateral, and always mild on the fourth to fifth day after the onset of the meningeal signs. The orifice of Stensen's duct is red. Complete recovery is the rule. It is interesting to note that Wollstein [13] with injections of saliva from infants in the initial stage of mumps into the subarachnoid space of young cats was able to produce a benign aseptic meningitis; the cerebro-spinal fluid obtained was under pressure, and there was a marked increase in cells and protein, but the cells were 66 per cent. to 84 per cent. polymorphs. Wallgren reports a child with aseptic meningitis, while a brother had typical bilateral mumps. Recently I reported a case of influenzal meningitis,[14] with Pfeiffer's bacillus proved in the cerebro-spinal fluid, which followed a few days after a bilateral parotitis clinically indistinguishable from mumps.

In my own cases recorded below, I must confess that special notice has not been taken of the parotid glands, so quite possibly mild enlargements have been missed.

Epidemics of mumps, however, do not produce case reports of acute aseptic meningitis from fever hospitals.

7. *An Attenuated Form of Meningococcal Meningitis.*—Cases in which the cerebro-spinal fluid contains persistent polymorphs and yet is sterile, probably are often abortive cases of meningococcal meningitis. The change, however, from polymorphonuclear to lymphocytic predominance does not occur, and in addition epidemics of frank meningococcal meningitis do not coincide with acute aseptic meningitis. The very rapid course and recovery, the absence of residual lesions (particularly hydrocephalus), and the repeatedly negative bacteriology are all against the identity of the two diseases.

Author's Cases.

CASE 1.—Boy of 12. Four days before admission sudden onset of high fever and headache; mild sore-throat. He had been in bed ever since, refusing food and complaining of headache and stiff neck. Considered to be a case of meningitis.

On admission to hospital the temperature was 103·2°. The boy appeared very ill with marked stiff neck, rigidity of the muscles of the back, positive Kernig and Brudzinski's sign. The pupils were equal and reacted well to light. No squint. No nystagmus. Fundi normal. Cranial nerves all normal. Knee- and ankle-jerks brisk; bilateral flexor response. Marked photophobia and dermographia. No abnormal physical signs were found in the abdomen, chest, or throat. Mantoux test: positive to 0·1 mg.

Lumbar puncture: clear fluid under moderate increase of pressure. Protein, definite excess. Cells 230, nearly all lymphocytes. No tubercle bacilli found. Cerebro-spinal fluid sterile on culture.

Two days later the general condition was about the same, but temperature was now normal. Still marked headache and stiff neck. Next day lumbar puncture was done again; the cerebro-spinal fluid was still under pressure, but the cells were much fewer, about 140, lymphocytes. Sterile on culture. After another two days, all symptoms and signs had disappeared, and the boy was discharged well 10 days afterwards.

Re-examined three months later he seemed perfectly normal.

CASE 2.—Boy, aged 3, sudden onset of headache and vomiting on Nov. 7th, 1930. Next day, mild generalised convulsions. The child lay curled up on his side in bed and looked a typical case of tuberculous meningitis, which was the diagnosis made when the cerebro-spinal fluid was found to contain "an excess of lymphocytes." No tubercle bacilli found.

Seen by me four days later, the child was lying curled up in bed, very irritable, and very resentful of being examined. Photophobia but no squint, no nystagmus, and normal pupils. Kernig's sign positive; moderate stiff neck. No changes were found in the fundi: cranial nerves normal; all reflexes normal. No history was obtained of contact with any known case of tuberculosis and the Mantoux test (0·1 mg.) next day proved to be negative, so the possibility of a non-tuberculous meningitis was considered. (It has been shown by many observers that about 95 per cent. of cases of tuberculous meningitis have a positive Mantoux test.) Lumbar puncture was done and clear fluid under moderately increased pressure was obtained; there were 115 cells, all lymphocytes, and there was an increase of protein. No tubercle bacilli were found; the fluid was sterile on culture; the Wassermann reaction in the fluid was negative. No signs of any parotid swelling.

At this time the reports of cases abroad were seen, and it seemed possible that this was a similar case. Three days later the boy was much better, the photophobia and stiff neck was much less, and he was eating and sleeping well. A week later no physical signs of disease in the nervous system were found.

It is possible that the following case also is an example of acute aseptic meningitis.

Girl, aged 7, admitted to St. Thomas's Hospital on Oct. 14th, 1930. There was nothing of especial note in the family history, and beyond having measles at the age of 2, whooping-cough at 5, and chicken-pox at 6, the child had been fairly healthy. Two weeks before admission she complained of pains in the knees, ankles, and wrists; she had slept badly and had sweated excessively at night. These symptoms continued now and again, until three days before admission when she complained of mild generalised abdominal pain. She went to bed well on the night of Oct. 12th, feeling tolerably well, but woke next morning feverish with a severe headache and vomiting. All that day the vomiting continued, first the contents of the stomach and then a yellowish fluid.

On admission the child looked very ill, drowsy, and irritable, and curled up on the left side with her knees drawn up. Temperature 100·3°. The abdomen was retracted, but moved well except in the right lower quadrant; the upper and lower parts of the right rectus were slightly rigid and she was slightly tender in the right iliac fossa—rigidity and soreness due to the severity of the vomiting? Nothing abnormal was felt in the abdomen: she had been constipated for 24 hours. No physical signs of disease were found in the heart or lungs. Central nervous system: there was marked drowsiness, irritability, and photophobia. The pupils were a little dilated but equal, and they reacted well to light. Cranial nerves normal. There was pain and definite rigidity on moving the neck, and Kernig's sign was positive. All tendon reflexes were brisk and there was a bilateral flexor response. The urine was acid: specific gravity, 1030. No albumin or sugar. No pus, blood, or casts microscopically. Acetone++. No ear discharge; both drums normal. Throat normal.

The diagnosis seemed to lie between tuberculous meningitis and acetonæmic vomiting, so lumbar puncture was done next day. Clear fluid gushed out under great pressure; there were 36 cells per c.mm., lymphocytes and endothelial cells and the protein was 0·035 per cent. No organisms were found.

Oct. 17th: Better, but still drowsy; neck rigidity and Kernig's sign still positive; no fever. 19th: Less irritability and photophobia; no fever. 20th: Definitely recovering and now beginning to take an intelligent interest in her surroundings; neck rigidity and Kernig's sign just present; no fever. 22nd: No physical signs of disease found in the central nervous system. 28th: Discharged well.

On examination four months later there were no signs of disease in the nervous system. General condition excellent.

In conclusion, I should like to thank Dr. R. C. Jewsbury for his advice and for his permission to publish the third case which was under his care at St. Thomas's Hospital.

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MANCHESTER TUBERCULOSIS HOME, ABERGELE.—The Lord Mayor of Manchester (Alderman G. F. Pitt) last week opened the new Manchester Corporation's Tuberculosis Home for Children at Abergele, the first instalment of a scheme which will take patients up to the age of 15.

MIDDLESEX HOSPITAL NEW NURSES' HOME.—In 1929 the Queen laid the foundation-stone of a new nurses' home, the gift of an anonymous donor. The new building, which stands apart from the main hospital, but is conveniently near, was opened on July 29th by Princess Alice, Countess of Athlone. At the opening ceremony Prince Arthur of Connaught, chairman of the hospital, said that it was hoped that by having the nurses' home a short distance from the hospital it would be possible to avoid an institutional atmosphere, and to make the home into a residential college, where the nurses would have opportunity both for instruction and for recreation. He believed that if the high standard of accommodation offered in the Middlesex Hospital were copied in every hospital it would be easy to attract candidates for the nursing profession. In addition to a preliminary training school and class-rooms the new home is provided with recreation and smoking rooms, badminton and tennis courts, and a large swimming bath. Each of the bedrooms is fitted with running water and an extra electric light fitting over the bed. Facilities are provided for washing hair and for washing and ironing personal garments, while special pantries for making tea are open at all times.

CLINICAL AND LABORATORY NOTES

ARTERIAL THROMBOSIS ASSOCIATED WITH NEUROFIBROMATOSIS OF THE LUMBAR SYMPATHETIC CORD.

By E. D. Telford, F.R.C.S. Eng.,
professor of systematic surgery, university of manchester;
and
J. S. B. Stopford, M.D. Manch., F.R.S.,
professor of anatomy in the university.

The condition of thrombo-angeiitis obliterans has of recent years become more generally recognised and the literature of the subject is already considerable. In spite however of an increased knowledge of the clinical features of the disease we seem unfortunately no nearer to a solution of its ætiology. Racial pecularity, tobacco, cold, and hyperadrenalinæmia have each been invoked as a cause, but so far without conviction. We desire to place on record a case of extensive arterial thrombosis of the lower limbs in which a very definite and possibly causal lesion was found at operation on the lumbar sympathetic cord.

FIRST ADMISSION: AMPUTATION.

X. Y., male, 43 years, British born, an engineer's fitter, was admitted to the Manchester Royal Infirmary in February of this year. He stated that two years before admission he had noticed difficulty in walking and was obliged to rest after walking about 200 yards owing to severe pain in the calf of the left leg. The condition got steadily worse and within a short time began to develop in the right leg. For some weeks before admission he had been confined to bed and had suffered greatly from continuous severe pain and loss of sleep.

On admission, the left lower extremity showed gangrene of the great toe and a large patch of gangrene on the dorsum of the foot involving also the fourth and fifth toes. The circulatory condition of the limb was very grave; no pulsation could be obtained below the common femoral artery at Poupart's ligament. The right leg was also seriously involved but showed no actual gangrene; a slight pulse could be felt in the superficial femoral artery on this side.

The man's general condition was critical; he was weak, emaciated, and in a state of constant rambling delirium, due no doubt to septic absorption and want of sleep. The case appeared to present the clinical features of thrombo-angeiitis obliterans of a somewhat rapid course.

Investigation of the patient showed that the Wassermann reaction was negative, the coagulation time of the blood was one and three-quarter minutes, and the blood calcium registered 10 mg. per 100 c.cm. The patient had always worked under cover and he was stated to have been a hard-working and steady man with no previous illness; his consumption of tobacco was about 20 cigarettes daily.

It was obvious from his condition that the only treatment possible was a supracondylar amputation of the thigh and this was done at once. The operation was followed by a prompt recovery, the delirium disappeared, his general condition improved, and he was discharged at the end of a fortnight with a well-healed stump.

A very complete dissection of the arteries of the amputated limb was made and many sections of all the named arteries and several smaller vessels were examined. All showed obliteration by well-organised and partially canalised fibrous tissue with the exception of the anterior tibial artery, in which the lumen was patent and but slight changes visible in the wall.

SECOND ADMISSION: LUMBAR SYMPATHECTOMY.

Early in April some six weeks after his discharge he was readmitted with gangrene of two toes and the heel of the right foot. It was decided to try the effect of lumbar sympathectomy and this was done on April 25th. Under spinal anæsthesia the right lumbar sympathetic cord was exposed by the retro-peritoneal route. Overlying the sympathetic cord was a chain of slightly enlarged lymphatic glands and on removal of these the cord was found to be very greatly thickened. The second lumbar ramus was identified and above this point the cord appeared normal. On tracing the cord downwards, the thickening was found to extend to the lower border of the common iliac artery where it broke up into perfectly normal branches. The whole cord from above the second lumbar ramus to its point of division into pelvic branches was removed.

A striking and immediate effect of the operation was the complete relief of the severe pain from which the man had suffered, and this relief of pain has so far been complete and permanent. Within 24 hours it was evident that the condition of the limb had improved; it was warmer, and the skin exhibited a better colour. The gangrenous areas also began to heal and within six weeks the large slough of the heel had been cast off, leaving a healthy granulating surface. A line of demarcation formed at the base of the two gangrenous toes, which are now rapidly undergoing spontaneous separation. The man has recovered his normal mental and physicial condition; he has required no anodynes since the night of operation, whereas before operation he was constantly under the influence of morphia.

THE EXCISED CORD.

An examination of the excised lumbar sympathetic cord shows the following features: the thickening of the cord was quite uniform and no nodular enlargements or irregularies were present. The transverse diameter throughout the affected portion was increased to some six times the normal size.

Sections were cut and stained with hæmalum and eosin, Mallory's connective tissue stain, toluidin blue, and van Gieson's stain. Microscopic examination at once revealed the fact that the enlargement of the cord was due to a great increase in the amount of supporting tissue. The nerve-cells stained normally and appeared to be perfectly healthy; they were scattered somewhat diffusely, as is not uncommon in this part of the sympathetic cord, but the cells were separated from one another more widely than usual owing to the increase in the amount of connective tissue around them. Large numbers of healthy nerve-fibres were to be seen and these were surrounded individually, or in small groups, by a dense fibrous tissue. It was significant to observe that the overgrowth of fibrous tissue was obviously more pronounced in the neighbourhood of nerve-fibres than it was around the nerve-cells. It was, however, in both situations excessive in amount and definitely more dense than normal. A careful investigation by suitable staining methods was made by Dr. E. R. A. Cooper with the object of discovering whether any trace of neuroglia was present, but none was found after a prolonged search.

The histological picture may be summed up as one typical of neurofibromatosis and the appearances suggested that the fibrous infiltration of the cord was capable of inducing irritation of the nerve-fibres.

An examination of the excised lymphatic glands showed that their enlargement was due to an old-standing quiescent tuberculosis infection; their condition appeared to bear no relation to the changes found in the sympathetic cord.

Comment.

The findings in this case raise several points of interest. In the first place the sections of the arteries from the amputated left leg showed changes closely resembling those which have been described by Buerger [1] and seen by us [2] as characteristics of

thrombo-angeiitis obliterans. There are, however, despite a superficial resemblance, some points of difference. The most striking of these is the absence of fibrosis around the vessels or of any thickening of the adventitia. Thickening of the intima and great increase of elastic tissue were commonly found; these features were distinctly more pronounced than we have ever observed in cases of undoubted thrombo-angeiitis obliterans. The typical collections of lymphocytes during the organisation of thrombi were not found, nor were any giant cells seen. Marked fibrosis of the tunica media was almost a constant feature, but no evidence of lymphocytic infiltration was found.

The second point of interest is the association of neurofibromatosis of the lumbar sympathetic cord with the vascular changes in the domain of the vaso-constrictor fibres which reside in that part of the sympathetic system. The histological picture suggested strongly that these sympathetic fibres were subjected to irritation by the fibrous tissue around them. In previous papers [3 4] we have submitted evidence which indicates that sustained irritation of vasoconstrictor fibres can produce vascular changes, and in the more recent communication we have suggested a theory as to how these changes may be induced. It seems reasonable to state that we have in this case which we now report another example of the same process, though of a different form from any we have yet reported.

A third feature worthy of comment is the immediate disappearance of pain after excision of the sympathetic cord. This relief of pain has been noted by other observers and it seems that one may confidently expect it after this operation. The cessation of pain might, at first sight, be interpreted as indicating the division by the operation of sensory fibres from the diseased blood-vessels, but there are a number of reasons which render such explanation quite untenable. We submit that it is a direct result of the vasodilatation which ensures that some substance is flushed out of the tissue spaces. We agree with the view recently expressed by Sir Thomas Lewis in his St. Cyres Lecture [5] that the primary cause of the pain is the accumulation in the tissue spaces of some substance which cannot be removed by the impaired circulation.

During the last six years we have been able to study closely some 40 cases of thrombo-angeiitis obliterans and we have found in no case evidence of a nervous lesion associated in a causal relationship to the disease. It is obvious that no definite deduction can safely be made from an isolated case, but it is possible that, although this patient presented many features which would appear typical of thrombo-angeiitis obliterans, we may in reality be dealing with an undescribed disease closely resembling thrombo-angeiitis obliterans but dependent upon a different and hitherto unsuspected cause.

We place the case on record, therefore, in the hope that it may stimulate further inquiry on these lines. We suggest that the operation of excision of the lumbar sympathetic cord should be practised more frequently in cases of thrombo-angeiitis obliterans. It seems probable that it may save amputation or at least considerably lower the level of amputation. Since it is clear that the beneficial result of the operation must depend upon the number of vessels which are still sufficiently unaffected to be able to dilate, the intervention should be done at as early a date as possible, preferably before the onset of gangrene. We would, in the light of our findings in this case, urge a very complete histological examination of the excised cord.

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A CASE OF DUPUYTREN'S CONTRACTURE.

BY W. A. TRUMPER, M.R.C.S. ENG.

IN June, 1930, I was consulted by a single woman of 65 on account of the condition of her right hand. The ring finger was bent so much that the tip was level with the base and the little finger was flexed to about half this extent, the other fingers being normal. Neither of the affected fingers could be straightened, and two small tender nodules could be felt beneath the skin to the ulnar side of the middle of the palm. The patient attributed her condition to the use of a chopper in cutting wood. It was a typical Dupuytren's contracture.

Wishing to try the effect of local treatment before advising operation, I prescribed a thorough inunction of the palm twice daily with ung. iodi. denigrescens. After about 10 days the treatment had to be suspended on account of a local dermatitis of the palm with the formation of blisters. Movement was already returning in the affected fingers, and, after a second course of inunction, which also resulted in blisters, they could be fully extended. The nodules in the palm had also nearly disappeared, but the grip, however, was weak, and when flexing all the fingers to form a fist, the tips would not quite touch the hand. Subsequent exercises have rendered the hand quite useful, and in appearance perfectly normal. The patient states that she still notices a slight weakness of grip when wringing clothes.

It seems to me doubtful whether the improvement noted in this case was due to the iodine absorbed, or to the hyperæmia which accompanied the dermatitis. In either case it suggests a possible method of treatment for a troublesome condition.

Ivybridge, S. Devon.

METASTATIC DEPOSITS IN PRIMARY ADENOCARCINOMA OF THE SINUS PYRIFORMIS.

BY J. DURLABH DHRUV, F.R.C.S. ENG., D.L.O.,
SURGEON TO THE JAMSHEDJI JIJIBHAI HOSPITAL, BOMBAY.

A NATIVE Christian male, aged 35, sought advice for hoarse voice and increasing difficulty in swallowing. A hard mass could be felt in the right anterior triangle of the neck, fixed to the deeper structures. On indirect laryngoscopic examination a fungating growth was visible on the right aryteno-epiglottidean fold extending over the sinus pyriformis, as well as on the inner surface of the mucosa lining the arytenoid cartilage.

The growth being inoperable, an antiseptic mouth-wash and anodynes were prescribed. The patient was steadily going down hill, and it was found he had lost power in one arm and leg on the same side. A blood Wassermann test was negative. He was placed on a course of iodides, for the hemiplegia was

supposed to be due to cerebral thrombosis. He had no headache or vomiting, and was conscious. (The fundus was not examined.) He had no pulmonary symptoms. He slowly died of asthenia.

At autopsy the right occipital lobe of the brain was found to be infiltrated with a growth the size of a lemon, soft in consistency, and bluish in colour. A similar mass the size of a chestnut was found at the apex of the left lung. Microscopical examination of the larynx, brain, and lung (affected areas) showed adenocarcinomatous changes. The only explanation for the hemiplegia of gradual onset was a microscopic invasion of the fibres of the internal capsule by the forward extension of the occipital growth.

It is possible that distant metastasis from laryngeal carcinoma is more common than is supposed. These cases should be seen early, and a very extensive dissection should be carried out.

MEDICAL SOCIETIES

ROYAL SOCIETY OF MEDICINE.

SECTION OF OTOLOGY: SUMMER MEETING.

THE summer meeting of this section took place at Queen's College, Oxford, on June 26th and 27th, the President, Mr. ALEXANDER TWEEDIE, being in the chair.

Dr. W. T. HILLIER (Birmingham) read a paper, supported by a series of large water-colour drawings, on the

Lateral Line Sense-Organs of Fishes.

The term "lateral line" signified a row of organs of special sense extending from the head backwards along the sides of the body; it was found only in creatures which led an aquatic life—i.e., fishes and amphibians. Not all kinds of fish had a lateral line; for example, neither the herring nor the mackerel had. Some fishes, such as necturus and amblystanaæ, had three lines on each side. The lateral line could be regarded as a poor relation of the human labyrinth. The auditory labyrinth had all the interest of a machine designed to fulfil a certain group of purposes, and consisted of a standing part and a moving part. It consisted not only of special nerve-endings, but also of accessories which served to protect those end-organs and improve their efficiency. Buddenbrock had stated, and had related experiments which supported that view, that there existed a definite functional relationship between the semicircular canals and the sense-organs found in the skin of many aquatic animals; and that the lateral line organs served for the perception by the fish of streaming water. Whether a fish moved against the stream or stayed in one spot was determined by visual stimuli. The lateral line was only part of a system of lines of special sense-organs, known as the neuromast system, because the end-organs were shaped somewhat like a nipple; there was also a series of lines over the head. In fishes which had scales, the canals of the lateral line pierced the scales, and usually there was one sense-organ to each scale. The organs of the lateral line proper were supplied by the lateral branch of the vagus, but those on the head by other cranial nerves. There existed in fishes also an acustico-lateral system. The marks in the bones caused by the acustico-lateral or neuromast system could be found in some of the very earliest forms of fish. The row of markings of the lateral line extended in an unbroken sequence along the body, often to the tail, so that the line must not be regarded as a series of segmental organs; it seemed to be no more than a repetition of one type of structure. Discussing the subject in the light of Darwin's views expressed in the chapter on Domestication in "The Origin of Species," he said that the alternation of generations was not an occasional curiosity, but a regularly recurring event in the phylogeny of animals, and quoted a number of instances of it. The development of the lateral line had been well shown by Henry Wilson in his account of the embryology of the sea bass; Beard had studied the development of the lateral line in the trout. Dr. Hillier himself had never been able, in his successful sections, to trace the nerves going to or from sense-organs; the nerve strand appeared to be incorporated in the epithelial lining of the canal. The sense-organs seemed to be concerned with the reception and interpretation of vibrations conveyed by water, and in the case of the amphibiæ the skin grew over the sense-organs during the terrestrial part of their existence. The most important contribution on the subject, so far, was that of G. H. Parker, in 1905. Parker found little to support the view that the lateral line was concerned with equilibration, and it was much inferior in this respect to the eye or the ear. Dr. Hillier's own experiments had shown that the lateral line on the underside was the sensitive one to external stimuli.

The PRESIDENT asked whether any connexion had been traced between the innervation of the lateral line organ and that of the utricle.

Dr. MUIR EVANS (Lowestoft) said he had tried to find out more about the connexion of the lateral line with the central nervous organisation. Herrick had pointed out that the great size of the vagal lobes in goldfish and carp was due to the fact that the fish received the sensation from the palatal organ in the roof of the mouth, which was covered by taste buds. A valuable line of investigation was on the relation of the acoustic lobe.

Mr. H. M. MACNAUGHTON-JONES submitted, and demonstrated by a series of models, some new conceptions on the

Physiology of the Ear.

It was currently taught and believed, he said, that the manubrium moved inwards and pushed in the stapes. The latter was supposed to be possible only by the pushing in of the foramen rotundum. His view, which the working models supported, was that a wave striking the membrana tympani caused the manubrium to move outwards, the foramen rotundum was pressed inwards, and the manubrium drew the stapes outwards. He did not found his new conception on the models, but made the models to prove his belief. He emphasised the great importance of maintaining a certain degree of tension on the stapedius muscle; it was also important for hearing that the stapes should be movable, and that the malleus should be tense.

The PRESIDENT said he believed that the tympanic membrane acted only as a protector of the contents of the middle ear. The functional integrity of the stapes seemed to be important, but the other two ossicles he regarded as of little importance, otherwise how could such excellent hearing exist with total

defect of the tympanic membrane and a tolerant middle ear? Barany had recently suggested that in conversation sound was essentially transmitted through the foramen ovale, the incursions of which were balanced by the excursions of the foramen rotundum. Recently it had been shown that for lower tone perception the functional integrity of the stapes was absolutely necessary. The chief route of higher tones was directly through the foramen rotundum.

Dr. LOWNDES YATES said that various theories were held as to the function of the ossicles, but presumably the elaboration of a joint between the incus and the malleus was not without good reason. A similar joint existed between stapes and incus. It seemed that sounds of very short wave-length must be physically absorbed by those joints, so that the sounds of higher pitch must get to the internal ear by some route other than by the membrane; the choice of route must be between the oval window and the round window. After removal of the ossicles and the tympanic membrane, the tuning-fork could still be heard, though lower notes did not come through so well. Hearing diminished pari passu with the onset and increase of fibrosis in the wound which had been made. The tensor tympani enabled the ear to rest, to cease listening when something was transpiring which the person did not want to hear.

Mr. ERIC WATSON-WILLIAMS agreed with the President that the ossicles and membrane had not much to do with hearing; and he pointed out that the argument advanced by Mr. Macnaughton-Jones rested partly on the assumption that the membrane was not elastic, whereas for the purpose it had to serve its elasticity was practically perfect, and it offered virtually no impediment to the transmission of waves of pressure.

Dr. E. A. PETERS read a paper on a case of

Cerebellar Abscess Drained Anteriorly to the Lateral Sinus.

The patient was a woman, aged 29, seen last April, who in 1917 had had a double mastoidectomy. There had been an intermittent discharge since then. For some months she had had headache which latterly had become more persistent; felt over the whole head, but chiefly in the occipital region. On the day of admission she vomited for the first time. The temperature was 99° F., pulse 116, urine, sp. gr. 1030, acid. Later the head was retracted and she had Kernig's sign and diminished abdominal reflex. Cholesteatoma with meningitis was diagnosed. At operation a large cholesteatomatous excavation was found in the petrous bone. The tegmen tympani was removed, and the temporo-sphenoidal lobe exposed by enlarging the wound upwards. On incising the dura mater the cerebrum bulged outwards but did not protrude. Infection of the labyrinth was negatived by the satisfactory condition of the cochlear nerve and the absence of nystagmus; therefore the other possible infecting area anterior to the lateral sinus was removed by a gouge. The underlying dura was found to be softened, and was readily divided, and a few ounces of pus escaped, indicating an intradural or superficial cerebellar abscess. The puncture was perfused daily, and b.i.p. dressing was applied during the first week, paraffin and flavine later. There had been no defined focal indication of cerebellar abscess. Dr. Peters stressed the value, in early acute cases, of packing off the infecting petrous bone from the dura mater with b.i.p. after performing mastoidectomy, with removal of the diseased areas of bone.

Dr. PETERS also read a paper on a

Test for Maximum Tuning-fork Hearing.

He said that tuning-forks still yielded very useful results in testing hearing, and the value of those results was increased if fractional representation was used, the nominator representing the observation time, while the denominator expressed the normal time in seconds. Jointly with Mr. R. Lake he had pointed out that an even pressure of 8 oz. eliminated the variations due to the amount of pressure. In a man aged 23 in the silence room the following standard results were obtained:—

Tuning-fork of 128 vibr.	Seconds.	Tuning-fork 256 vibr.	Seconds.
1. Applied to mastoid ..	27	1.	30
2. Tuning-fork on mastoid with tragus closing meatus	27	2.	55
3. Tuning-fork held half an inch from meatus	27	3.	95
4. Tuning-fork on tragus closing meatus	85	4.	95

At the Saturday session the subject of discussion was the

Physics of Sound and Physiology of Hearing.

This was merged with a general discussion on the questionaire on otosclerosis[1] issued by the Otosclerosis Committee of the Section.

Mr. F. C. ORMEROD, the hon. secretary of that committee, said that the committee was now chiefly concerned with the quantitative tests of hearing, using tuning-forks, the voice, the whisper, and mechanical devices. An initial and serious difficulty was the fact that no two tuning-forks, considered to be similar, behaved in the same way; different makes of fork gave different rates of decay of the vibrations. This necessitated getting into touch with the makers of tuning-forks; a series of meetings were held in London, and a good deal of work was done at Sheffield on the matter. Forks were now being made which would accord with the requirements enunciated in the first part of the report—namely, that the half-intensity period should be not less than three seconds and not greater than ten seconds. The National Physical Laboratory were not able to help with a formula based upon fork dimensions, their opinion being that the result must be reached by separate experiment. A mathematician in a Sheffield firm had promised to supply shortly tuning-forks which would come within the committee's requirements. Without this standard fork it was not possible to compare properly the results of different observers.

The committee had also gone into the question of audiometers, and a number of German and American machines had been tested. A large electrical firm in this country was working on an audiometer and hoped to turn out a reliable instrument at a reasonable cost. Audiography was also needed, and reliable charts could only be the outcome of reliable forks and audiometers. The work of the committee had extended over a long time because they were constantly encountering fresh difficulties.

Mr. HALL PIKE said that certain facts had recently become known to physiologists with regard to the mechanism of the cochlea—i.e., the phenomenon observed by Weaver and Bray—working in Princeton University. They had been engaged in assessing the

[1] This questionaire alludes to five types of case in which otosclerosis might be present, and the questions, 159 in number, are ranged under the following heads: 1. Ætiology: (*a*) heredity, (*b*) puberty and menopause, (*c*) sex, (*d*) pregnancy, (*e*) other conditions. 2. Examination of the patient: (*a*) local, (*b*) general, (*c*) hearing tests. Treatment: (*a*) general treatment, (*b*) local treatment, (*c*) operative treatment. It was decided at this meeting not to include "secondary otosclerosis," and to proceed with the inquiry on the lines indicated.

impulses in the auditory nerve, working on the lines of Adrian's investigations in this country. They placed one electrode on the exposed auditory nerve, and another on a different part of the body—working with cats—and connected these to an amplifying system with a loud speaker placed in an adjoining room. They then exposed the ear to sounds of various pitches. They found that all the sounds up to 5000 vibrations per second were faithfully reproduced in the loud speaker in the next room. Adrian's work had shown that the impulses in nearly all sensory nerves were more or less the same, and there was no a-priori reason for supposing that the auditory nerve would behave in any other way. Weaver and Bray considered these electrical changes in the nerve to be true nerve impulses, and then criticised the resonance theory and Adrian's work. Adrian had now been over the ground again. He found it was true that if an electrode was placed on the nerve, the effect stated was produced, but in order to get the effect it was not essential to place the electrode on the nerve; a thread electrode could be laid on the cochlea, on the neighbouring bone, and on the external auditory meatus, without touching the nerve, and the same effects ensued. Adrian regarded these—as he called them—electrical variations as due to the microphonic action of the cochlea. That was not incompatible with the existence of vibrations of the basilar membrane, such as the resonance theory implied. The practical point was that attempts to assess the true impulse in the auditory nerve were, in mammals at any rate, unlikely to succeed, since the true impulse would always be swamped by these microphonic impulses.

The effect of the impulses depended on the vitality of the cochlea; if the circulation to that organ was shut off, or if the auditory nerve was cut, the impulses ceased. This phenomenon was regarded by Adrian as due to the concomitant destruction of the blood-supply. Otologists were looking for a graphic way of representing what the ear was doing.

Sir JAMES DUNDAS-GRANT thought one important point was the difference of action of the nerve when alive and when dead.

Mr. GRAHAM BROWN said the whole auditory apparatus approximated to a wireless receiver; indeed, an analogy could almost be drawn between a microphone and the cochlea, and the question could be regarded as one of pure physics. Presumably this line of testing would eventually be carried out in man.

Mr. E. WATSON-WILLIAMS related a case in which, during a radical mastoid operation, when granulations were being picked out, the stapes was discharged with a little fluid. Two days later the patient had slight nystagmus when turning her eyes to the side opposite to the operation, but at that time there was no vestibular disturbance. She had, however, all the tuning-fork symptoms of ear deafness, and the Weber response was referred to the operated ear—i.e., she had no nerve deafness, though her labyrinth had been opened.

THE ORGAN OF CORTI.

Referring to otosclerosis, he said the terms generally used in discussing deafness were misleading. Too commonly, mention was made of inner-ear deafness without stating whether a lesion of the scala tympani or of the organ of Corti was meant. The true line of distinction between one type of deafness and the other was the organ of Corti itself. If there was no actual damage to the organ of Corti, the deafness was a conduction deafness; and it helped matters considerably if otologists drew the line of deafness not between middle ear and inner ear, but between ear deafness and nerve deafness.

The PRESIDENT said that the scala tympani and the scala vestibuli must be considered as the conducting medium. At one time there was a dictum at the Vienna school that if the stapes were displaced the fatal result was so certain that it was right to do a vestibulotomy, but Mr. Watson-Williams's case showed that this was not always necessary.

Sir JAMES DUNDAS-GRANT reminded the meeting of a paper he read some years ago showing a method of audiometry by tuning-forks, correcting the time error by a logarithmic scale, and reducing it to true loss of hearing power. That, however, accounted only for duration, not for the dying away of the vibrations. In discussing the physiology of the ear, he thought too little attention was paid to the importance of the fenestra rotunda; in his opinion this was the way by which high-pitched tones reached the labyrinth. The tones impinged where they were most likely to stimulate the basal fibres. For the transmission of deep tones he thought the tympanic mechanism was best suited.

SECTION OF UROLOGY.

AT a meeting of this section held on June 25th, the chair was taken by the President, Mr. S. G. MACDONALD, and Mr. OGIER WARD opened a discussion on the treatment of

Inoperable Carcinoma of the Bladder.

He said that the word "inoperable" was commonly used to describe cases which could not be cured by surgical removal of a growth—usually cases with wide extensions or secondary deposits, or in patients too weak for radical procedures. The chances of cure in cancer of the bladder were particularly difficult to estimate, and an exploratory examination was not generally useful; the decision had to rest on cystoscopy and bimanual examination. Fortunately the determination was not of the same importance in cancer of the bladder as in cancer of many other organs, because operative excision of the primary growth in squamous-celled, ulcerative, and nodular infiltrating types was the best treatment if it was at all possible, whether it cured or not. Therefore "inoperable" as applied to bladder growths meant only those which were fixed. Provided the cystoscope revealed any useful margin of healthful mucosa round the neoplasm, and provided the patient was fit, excision was useful for relief if for nothing else. Under this definition radium would obviously only be used in cases where there were considerable indeterminate extensions, and cure was very unlikely. Only too often radium produced large, chronic ulcers accompanied by severe cystitis. Radium might, however, arrest hæmorrhage and reduce suffering if the urine were kept sharply acid. Mr. Ward had treated 43 cases by radium between 1927 and the end of 1930; 15 of these had been treated by radium and open operation and 12 were dead. A further 11 did not live more than 12 months, but 3 had benefited to some extent.

RADON SEEDS.

The radon seed method, though of limited application and manifest imperfections, had some practical value. A flushing cystoscope must first be used, and the seeds could be inserted through the cystoscope, which afforded very accurate control of their deposition. Misplaced seeds were usually voided

within 48 hours. Mr. Ward had used this method in eight cases which were beyond all possibility of excision; three had benefited, and one even appeared to be cured. The seeds were 6·0 by 1·1 mm. in size; their average strength was 1·3 to 1·7 millicuries, and 10 or 12 seeds on an average could be implanted at a time. Usually Mr. Ward did not combine diathermy with radium, though sometimes diathermy was used to destroy a cauliflower type of growth or to reduce hæmorrhage. Of nine cases of villous carcinoma treated with radon seeds, seven had had previous diathermy and five appeared to be cured. Two cases of "bald" carcinoma had been treated with seeds and in one the treatment had been at any rate temporarily successful. Nine cases of papilloma had been treated with seeds and cure appeared to be possible in four of them. Two more had undoubtedly benefited. Diathermy had proved of great value in these cases. These methods had the advantage that it was not necessary to open the bladder. Cystotomy was only useful to prevent attacks of clot retention.

SECTION OF NERVE TRACTS.

The terribly severe pain might be relieved by nerve section; the simplest method was the operation practised by G. Cotte of Lyons—the division of the presacral nerves on the fifth lumbar vertebra. Mr. Ward quoted a case he had seen at Prof. von Lichtenberg's clinic in which constant pain radiating down both sciatic nerves in an advanced infiltrating case of prostatic carcinoma had been entirely relieved by this operation. Mr. Ward had performed the operation three times during the last month. Any difficulty encountered was chiefly due to extra-peritoneal fat or to the proximity of the inferior mesenteric vessels. All three patients had been considerably relieved. Pain could also be mitigated by chordotomy; laminectomy over the ninth dorsal segment and division of the antero-lateral tracts along a Stebbing's director. This operation was more severe, but its effect was certain.

Mr. KENNETH WALKER said that inoperable carcinoma of the bladder presented a very difficult problem. Any measure of relief must be adopted to mitigate the frightful suffering. In his hands radium needles had had deplorable results; it was not easy to keep the urine acid, and ulceration with incrustation made the patient's remaining weeks worse than they would otherwise be. Division of the sacral nerves was a method worth pursuing. He had seen chordotomy give immediate relief to excruciating and intractable pain, but it was a separate procedure; what was needed was some method that could be carried out forthwith, as soon as the bladder surgeon found an inoperable growth. Presacral nerve section could not be as certain in its results as chordotomy, for in some cases the pain might be due to extensions. Presumably nerve section would be suitable for cases where the pain was associated with micturition only and was not continuous.

IMPLANTATION OF THE URETERS.

Mr. FRANK KIDD thought that the pain was more often due to spasm of the bladder wall than to direct pressure, and that presacral division probably acted by relieving tension. In his opinion real progress would be made along the lines of speedy implantation of the ureters into the rectum with total extirpation of the bladder. This relieved pain more satisfactorily than any other method and each step alone was not very dangerous, though the procedure was extremely risky if both steps were performed at one sitting.

Mr. CYRIL NITCH said that he had transplanted the ureters in 14 patients, seven of them cases of inoperable malignant growth of the bladder. All these seven had died, and all the non-malignant cases had recovered. The objection to the procedure was that in almost all carcinoma cases one or both ureters were thickened; the periureteral lymphatics were presumably infected and very likely the kidneys as well. He concluded, therefore, that transplantation of the ureters was practically hopeless at the present day for severe cases, though in milder cases it might be useful in order to afford relief when no other procedure was justifiable.

TWO TYPES OF GROWTH.

Mr. E. W. RICHES recognised two main types of growth: the epitheliomatous ulcer and the more common hypertrophic—papillary or nodular—formation. The former gave rise to earlier metastases, while the latter might long remain a local growth. The prognosis and treatment were different in the two types. For the papillary type the best treatment was local excision by a cutting current followed by regular and persistent diathermy per urethram; this type was also perhaps more amenable to radium. The repeat treatments should be carried out under general anæsthesia every few months, and in many cases the growth could be kept under control. Radium inserted from inside the bladder had invariably caused a large slough in his cases, but had nevertheless given relief. Deep X ray therapy had not been successful but might be of value where there was lymphatic involvement. Permanent cystotomy did not give relief. The patient was given a better chance if the bladder were opened, because large masses of papilloma might be removed and also because the cystoscopic diagnosis of inoperability was so uncertain.

Mr. J. P. ROSS thought that presacral nerve division was better than chordotomy because it would relieve pain without interfering with sensation in the lower part of the body. Though chordotomy was more certain, it should be reserved for a final measure.

DIATHERMY.

Mr. JOCELYN SWAN believed that the surgeon could do much more for the papillary type of growth by extensive diathermy through a suprapubic opening than with radium. Astonishingly good results were obtained in the relief of pain. He had reserved radium for epitheliomatous growths, but had not obtained very satisfactory results. In his earlier cases he had perhaps used too heavy doses, and the result had been extensive sloughing which had greatly increased the patient's suffering. Radon seeds might be useful for growths which were inoperable by reason of position rather than of size. He preferred to insert them suprapubically, as the open incision allowed more even deposition than cystoscopic insertion. Transplantation of the ureters had in his hands given marked relief, but the great fallacy in this procedure was that in inoperable carcinoma of the bladder one or both kidneys were nearly always infected. Permanent suprapubic drainage and deep X ray therapy had given no relief at all, and so far the radium bomb had not proved any better. Glandular spread did not respond to radium. In his opinion, hope for these cases lay in diathermy for the papillary form and small doses of radium, inserted suprapubically, for the epitheliomatous form.

REPLY.

Mr. WARD, in reply, emphasised again the striking case he had seen in Prof. von Lichtenberg's clinic

in which bilateral sciatic pain had been relieved by presacral nerve division, and urged that this procedure was worth trying for all types of pain and not only for irritable bladder.

NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

CONFERENCE AT MARGATE, JUNE 25TH–27TH.

THE seventeenth annual conference of the Association opened with a discussion on the

Protection of the Child from Tuberculosis,

the introductory address being given by Sir ROBERT PHILIP (Edinburgh), who urged the routine and systematic use of tuberculin to determine at the earliest possible moment the occurrence of tuberculous infection in the child. The test, repeated at intervals, was harmless and painless, while the knowledge obtained from it was priceless. As soon as a positive reaction appeared for the first time, nothing need be done while the child's health was maintained; but any failure of health would call for careful watching and the adoption of suitable measures. Only a minority of reactors would require individual treatment because of obvious disease, but since it was not easy to single out those who would develop disease, the knowledge afforded by a positive reaction at a given date would prove of supreme service in the interpretation of untoward symptoms and the adoption of suitable precautions. Sir Robert urged a closer coöperation between the department of maternity and child welfare and that of tuberculosis in relation to this problem of tuberculisation. If, he said, serious tuberculous illness of all kinds could be arrested under a simple sanatorium régime, it was no less possible, and was better policy, to stop the progress towards gross disease by ensuring that every nursery, every home, and every school should be run on the same physiological principles which formed the basis of sanatorium life.

Dr. EUGENE L. OPIE (Phipps Institute, Philadelphia) who followed dealt with the

VARYING MANIFESTATIONS

of tuberculosis at successive periods of childhood. A better understanding of the pathogenesis of tuberculosis and improved methods of recognising it had in recent years, he said, made three kinds of investigation notably profitable: (1) the search for tuberculosis in those who were apparently in good health (latent tuberculosis); (2) observation of the various forms of tuberculosis discoverable both in the sick and in the well, carried on over a period long enough to determine their ultimate outcome; and (3) reconsideration of factors involved in the transmission of the disease. Although the tuberculin test determined the presence or absence of tuberculous infection, the intensity of the reaction gave no widely applicable information as to the severity of the infection. Radiological examination defined with a fair degree of precision the anatomical characters, and measured the extent of the graver tuberculous lesions. Tuberculosis that had already undermined health and was recognisable by physical examination or by the discovery of tubercle bacilli in the sputum had by that time almost invariably produced advanced destructive changes in the lung. The examination of children living in contact with tuberculosis and the routine examination of school-children, had shown that grave pulmonary lesions could be discovered at a much earlier stage. The first of these two simple procedures had disclosed latent tuberculosis with such frequency that it was possible to follow up a considerable variety of lesions from their earliest stages until they developed into disease endangering life, or healed with the formation of fibrous or partially calcified scars.

The examination of school-children by means appropriate for the recognition of tuberculous infection offered, said Dr. Opie, the opportunity of measuring its frequency and severity in those who were believed to be in good health. Until the examination of presumably healthy children had been more widely applied, and those in whom lesions had been discovered had been observed through a period of years extending into early adult life, there could be no exact knowledge of their ultimate fate. Although most of the tuberculous infections of children as recalled by the tuberculin test produced focal lesions of lungs and lymph glands that became healed and calcified and caused no impairment of health, radiological examination of children well enough to attend school and of healthy children exposed to tuberculosis in their families had demonstrated the frequent occurrence of extensive infiltrating lesions of the lung parenchyma which, as subsequent observation showed, not infrequently developed into serious disease. Massive caseation of tracheo-bronchial lymph glands was recognisable only when well-defined, rounded, or oval masses could be seen in films at the hilum of the lung or on one side of the trachea. Such glands were of grave danger to life, especially in infancy and early childhood. With tuberculous infiltration of the childhood type there was diffuse opacity in X ray films, indicating tuberculous infiltration in some part of the lung field other than the apex. In one-third of the school-children in whom it was detected it was accompanied by inconspicuous symptoms and physical signs, and might be looked upon as clinically manifest, even though the children were believed to be well.

The adult type of pulmonary tuberculosis made its appearance during adolescence, and was, Dr. Opie said, a more serious lesion than the childhood type in younger children, being the precursor of much of the tuberculosis of early adult life.

Dr. LETITIA FAIRFIELD (County of London) dealt with the

Administrative Outlook

of tuberculosis in children under 16. The special difficulties of the public health officer in dealing with tuberculosis were, she said, partly due to the fact that it was both an overt disease of infancy and childhood causing death and disablement, and also a latent disease of childhood causing death and disablement only when adult life was reached. Administrative measures for infants and children up to the age of 5 years included mainly, provisions for the purity of the milk-supply, the protection of the infant from family infection, and the artificial immunisation of infants. The last of these, however, was not yet a practical proposition for English public health authorities in the light of present administrative experience. The general care and protection of the 2 to 5 age-group was admittedly a weak spot in public health administration. It affected the tuberculous child from the point of view of early detection of overt disease, heightening of resistance levels by attention to general health, and observation after the debilitating effects of the exanthemata. The difficulty was mainly a financial one, but the heavy "death and damage" rate of common ailments during these years should, the speaker thought,

justify the expenditure of public money. The school period 5–15 showed a marked diminution of both pulmonary and non-pulmonary forms. Three important points were: (*a*) the necessity for more intensive and scientific research into the so-called "pre-tuberculous" group to disentangle those genuinely infected with tuberculosis from other similar physical types; (*b*) the value of energetic examination of contacts; (*c*) the coöperation of the tuberculosis service with school doctors. The necessity for vocational education should not be overlooked, in view of the importance of keeping children with arrested tuberculosis out of unsuitable trades or unskilled labour, where they would inevitably break down. Dr. Fairfield spoke of the probable value of raising the school age in enabling children to face the strain of industrial life in better conditions and in closing up the present gap in supervision between the school-leaving age of 14 and insurance at 16.

Protection at Various Ages.

Dr. REGINALD C. JEWESBURY considered the protection of the child from tuberculosis

AT BIRTH AND DURING EARLY YEARS.

Non-pulmonary tuberculosis was, he said, a common disease in the child, due to infection either by the humane or bovine type of bacillus. From the age of 1 to 5 years the tuberculous infection tended to attack the mesenteric and abdominal glands, the bones and joints, and the meninges. From 5 to 15 years it tended to attack chiefly the bronchial and mesenteric glands. Pulmonary tuberculosis in young children was rare, but when present it was serious. Infection from the bovine tubercle bacillus was definitely a preventable disease. Pasteurising or, better still, boiling the milk would make it safe for the child. In cases of infection from the human tubercle bacillus in the home, the risk could be minimised by careful training of the consumptive member of the family in the necessary hygienic precautions, the removal of an active and infectious case to a residential tuberculosis institution or proper isolation and nursing in the home or elsewhere, or, finally, by the removal of the child from the tuberculous home. Prophylactic vaccination by B C G had been applied in all European countries except England, Austria, and Portugal, but its use as an immunising agent, particularly for young children, could not be advocated until it could be shown to be free from virulence under all conditions and that it produced an effective immunity.

DURING PRE-SCHOOL YEARS.

Prof. S. LYLE CUMMINS (Cardiff) described the main problem as that of detecting the existence of active, though larval, tuberculosis, especially in the tracheobronchial lymphatic glands or in the form of early focal lesions of the lung tissue. Children harbouring lesions of this kind might, he said, appear to be in excellent health. There were two main aids to diagnosis: X ray examination and tuberculin tests. How to bring these tests to bear in a practical and economic way upon the children in infected homes was yet unsolved. Search should be made for new methods of detecting activity in latent or larval tuberculosis; such methods might be found, he said, in the application to young children of certain types of blood examination. Much more information was required as to the exact significance of tuberculin tests during the pre-school period of life, and arrangements should be made for the careful following-up of tested children during the subsequent years.

Dr. T. R. ELLIOTT (Salop) suggested that the two chief requirements—(1) prevention of infection; (2) increasing individual resistance—could best be met by education in healthy living, in food values, and in the special food requirements of growing children, by better housing in general, and of infectious cases in particular, and by a more general use of open-air shelters for contacts; by occasional boarding-out of threatened children, and by the segregation of advanced cases. He outlined a scheme started in Shropshire in 1923 by which a pregnant woman suffering from pulmonary tuberculosis was sent to a sanatorium until her confinement was due, when she entered a nursing institution. As soon as the baby was born it was sent to a country home for ailing babies, where it was kept for 12 months under open-air conditions. Up to the present, none of the 33 babies thus dealt with had developed tuberculosis.

DURING SCHOOL AGE.

Dr. R. H. CROWLEY (Board of Education) said that although statistics had revealed the relative unimportance of the incidence of pulmonary tuberculosis at this stage of life, compared with earlier and later, yet even during the school period it was by no means negligible as a cause either of death or of disabling disease. In 1929 the death-rate in England and Wales from all forms of tuberculosis was 300 between 5 and 10 years, and 330 between 10 and 15 years, per million living; and the number of tuberculous children of school age in England and Wales on Dec. 31st, 1930, returned by school medical officers was 24,077. It was, he said, of primary importance to understand the significance of so-called latent tuberculosis, especially during early and mid-adolescence. Opie and others had made it probable that incipient tuberculosis of early adult life was advanced latent tuberculosis of adolescence. The surest method of protecting the child of school age was to remove a likely source of infection, or, failing that, to dilute it. Resistance to disease might be increased by providing midday meals, opportunity for rest, especially in the case of younger children, and facilities for playing and bathing. From the administrative point of view what was required was a medical service in the home linking up with the infant welfare and the school medical services.

Dr. H. MIDGLEY TURNER (Sheffield) said the main obstacle in the protection of children against serious tuberculous disease was the failure to realise that while sputum-positive pulmonary tuberculosis was rare among children, early pulmonary tuberculosis in the non-infectious stage was of frequent occurrence. There were sound reasons for believing that about half the serious tuberculous disease in young adult life owed its origin to childhood infection.

Dr. L. S. T. BURRELL (London) said he doubted whether small infections acquired naturally gave real protection to the individual, and although experiments on the lines of immunisation were to be encouraged, he thought that endeavours to stamp out tuberculosis should centre round general hygiene. Any steps which were effective in making the individual more contented and free from worry, able to obtain good food, and to live under hygienic conditions, tended to stamp out tuberculosis.

EDINBURGH OBSTETRICAL SOCIETY.

Ureteric Lesions Causing Abdominal Pain.

A MEETING of this society was held on June 10th with the President, Dr. H. S. DAVIDSON, in the chair.

Dr. DUNCAN M. MORISON read a paper on Ureteric

Lesions as a Cause of Abdominal Lesions: A Consideration of "Ureteritis" or "Ureteral Stricture"—a condition which had only been recognised comparatively recently as a clinical entity. The pathology was still obscure. As proved by corrective treatment many cases of apparently obscure abdominal pain were due to ureteric lesions. The zones of the ureter most frequently affected were the nodes or physiological sites of narrowing—i.e., (*a*) pelvo-ureteral junction, (*b*) where the ureter crossed the iliac vessels, (*c*) transvesical portion, (*d*) in women, where the ureter was associated with the broad ligament. Two types could be differentiated, congenital and acquired. The congenital type, due to some developmental error, was frequently characterised by a simple localised narrowing without any intramural thickening. The acquired form was apparently secondary to some primary focus of infection, such as tonsils, teeth, prostate, or cervix. It might also be induced by certain forms of repeated severe physical exertion—i.e., hammer throwing. The earlier phases of a ureteritis were associated with local hyperæsthesia of the overlying mucosa, any stimulus of which readily produced ureteral spasm. The initial stage of the infection did not give rise to any appreciable reduction of the ureteral lumen, but later, as intramural changes became more evident, localised zones of narrowing occurred at the sites affected. The intermittent attacks of spasm, and the more continuous impairment of the ureteral lumen, led to an increasing interference with urine conduction and the formation of stasis within the renal pelvis. Apart from the discomfort there was thus a progressive hindrance to renal elimination. As a general rule, low ureteritis would take longer to affect renal damage than would one situated at the pelvo-ureteral junction. The lumen of the ureter at the affected site rarely showed very marked reduction; hence the term ureteral stricture commonly applied was inaccurate except in a few instances where a definite fibrous stenosis was present. The use of this inappropriate term had led to misunderstanding of what was meant by this condition.

SYMPTOMATOLOGY.

The patient usually had a mild degree of toxæmia with lassitude, loss of mental acumen, headaches, nervousness, and irritability.

Local symptoms were attacks of vague pain in either kidney angle, or laterally below the costal margin, attended with nausea or sickness. It was probable that, in the presence of a ureteritis of the pelvo-ureteral junction, occasionally a dull ache was felt just below and lateral to the umbilicus. When the lesion was at the pelvic brim pains were referred to the inguinal region. Groin pains without bladder symptoms would point to a broad ligament source, while a suprapubic ache associated with attacks of urinary frequency usually indicated involvement of the ureter at or near its transvesical portion. If, as frequently occurred, a patient had more than one portion of the ureter affected, there was a corresponding grouping of these symptoms. The attacks of pain were commonly described as dull, persistent, and aching in character, frequently likened to a toothache. They might last from one to several hours. The pain was gradual in onset, reached a considerable degree of intensity then slowly subsided. At the period of intensity or most marked ureteral spasm there was very commonly a sense of renal discomfort indicating a damming back of urine on the renal pelvis. The pain was not induced by exercise, but fatigue or excessive exertion tended to bring it on. Patients frequently complained that they were awakened in the early hours of the morning with the pain, and that relief was only obtained by rising and walking about for a short time. It might be inferred from this that in the recumbent position the ureter was relatively more extended, and that the slight tension irritated the localised inflammatory area within the ureteral wall. There might be intermissions from pain for days, weeks, or months. Since a ureteritis favoured the formation of stasis in the higher urinary tract, chronic or relapsing pyelitis and calculus formation might occur as secondary conditions. It was essential that the primary contributing factor should not be overlooked.

DIAGNOSIS AND TREATMENT.

Since the symptoms might closely simulate those of the chronic appendix and disease in the pelvic organs, differential diagnosis was not easy. The absence of bladder symptoms in all but the transvesical lesion, together with a negative urine, tended to discount the possibility of any pathological condition of the urinary tract. A cystoscopic examination would fail to detect the lesion if ordinary straight ureteral catheters were employed unless the degree of ureteritis was sufficiently marked to render a stenosis evident. A positive diagnosis was based on the following findings: (*a*) the presence of residual urine in the renal pelvis; (*b*) calibration of the ureter by a "bulbed" bougie, noting mechanical resistance to the passage of the bulb or "hang" on its withdrawal, and the local induction of pain, and its character; (*c*) the presence following instrumentation of a reproduction or an exaggeration of the pain previously complained of.

Varying amounts of residual urine were to be found in the renal pelvis in cases of long standing or established ureteritis, but in the more recent types where ureteral drainage was still adequate there was usually none. In the earlier stages accordingly reliance had to be placed on calibration. By the employment of "bulbed" bougies the entire length of a ureter could be readily palpated and any altered zone detected. By a mechanical sense of touch combined with the statement of the patient regarding the site and character of pain produced, the location and type of a ureteritis might be determined. In doubtful cases, if the pain produced during or following the examination was not similar in character and location to the previously experienced pain, the ureter might be dismissed as a possible factor.

Treatment consisted in a course of progressive ureteral dilatation till a size of "bulb" bougie No. F.12 could be easily tolerated. By this means the attacks of pain were alleviated and, since better ureteral drainage was achieved, there was a corresponding removal of stasis within the renal pelvis with consequent benefit to general health.

Dr. J. R. CAMERON read a paper on Intracranial Injuries in the New-born, and their relations to Breech Delivery. He showed six dissected specimens of skulls from infants who had died either at or soon after breech delivery from intracranial injury. He described in detail the birth record of these cases, and suggested an association between the clinical management and the intracranial damage. The various anatomical factors involved in the production of these injuries was discussed.

Dr. W. P. KENNEDY gave records of a case of Streptococcal Infection of the Uterus Complicating Pregnancy.

REVIEWS AND NOTICES OF BOOKS

Pathology of Internal Diseases.

By WILLIAM BOYD, M.D., M.R.C.P. Edin., Dipl. Psych., F.R.C.S., Professor of Pathology in the University of Manitoba; Pathologist to the Winnipeg General Hospital. London: Henry Kimpton. 1931. Pp. 888. 45*s*.

THIS work is designed as a companion volume to Prof. Boyd's text-book of Surgical Pathology, published in 1925, and we predict for it an even greater success. There is need at present for a text-book of pathology suitable for the average physician. Many of those in general use are too large and too specialised to make an appeal outside the world of pathologists with the result that the physician tends to seek pathological information in the text-book of medicine. With this want in mind Prof. Boyd has endeavoured, with singular success, to act the part of the clinical teacher as well as the teacher of pathology, and to produce a book which will be suitable for the practising doctor and for those entering for higher examinations in medicine. His work deals with the special pathology of those diseases which are to be found in the medical wards of a general hospital. In order to avoid overlapping with his text-book of Surgical Pathology, the author has selected and pruned his material in such a way that certain matter which would find a place in a systematic text-book has been omitted. The omissions are of no great importance, however, and the book is comprehensive enough for practical purposes. Prof. Boyd takes the view that the chief purpose of pathology is to aid the physician in his work, and he discusses all problems in the light in which they occur to the clinician, making a special point of correlating the symptoms with the morbid anatomy of the disease. In order also to make the book as self-contained as possible, he has prefaced most of the sections with brief introductory notes on the anatomy, histology, and pathological physiology of the organ concerned. The reader whose activities have been remote from a medical school will have no difficulty in linking up the teaching in this work with his background of pathological knowledge. Much space is given to discussions of research and recent advances in pathology, and a useful list of references is appended to each section.

Prof. Boyd is not only a teacher possessing individuality and force but he is a writer of ability. He opens his work with the following words: "Of all the ailments which may blow out life's little candle, heart disease is the chief." Having stepped on this literary tight-rope he deftly maintains his poise to the last page. Since his book is not only readable but sound and up to date and clear, it should be popular with physicians and to those pathologists who retain some interest in clinical medicine.

Uber Physiologische Grundlagen bei der Ernährung Tuberkulöser.

By Prof. Dr. A. DURIG, Vorstand des Physiologischen Institutes in Wien. Vienna: Moritz Perles. Pp. 80. M.3.20.

Prof. Durig has written an interesting monograph dealing with the various aspects of metabolism and diet in relation to tuberculosis and has brought together a good deal of material which is not to be found in ordinary text-books. Beginning with mortality statistics of the war, when food conditions in all countries had an adverse effect on tuberculosis, especially in Central Europe, and continuing with the Charlottenburg figures on real wages and tuberculosis, the writer examines the many factors, anatomical, physiological, psychological, and pathological, which enter into this problem of metabolism and tuberculosis. Obviously, mere increase in adiposity does not necessarily add to the powers of natural resistance to tuberculous infection, and the time has gone by when doctors stuffed their patient ad nauseam. Account has to be taken of many factors not recognised by a previous generation of physicians. Prof. Durig includes in his survey most of these modern questions, such as the use of insulin, the vitamins, and the Gerson diet which has been so extensively tried out in Germany. A place is given also to more academic physiological topics, such as Pavlov's conditioned reflexes. The book is happily free from those long tables of caloric values of foods and the diagrams of intake and output which generally complicate this type of book; but it lacks also—and this we deplore—both a subject index and a bibliography, two very valuable adjuncts to a monograph which covers so many views and schools of thought. The use of chapter and sectional headings would also add to the convenience of the reader.

Organic Chemistry.

For Medical, Intermediate Science and Pharmaceutical Students. Second edition. By A. KILLEN MACBETH, M.A., D.Sc., F.I.C., Professor of Chemistry, Adelaide University. London: Longmans, Green and Co. 1931. Pp. 296. 6*s*. 8*d*.

THIS little book is intended to present the fundamental aspects of organic chemistry to the student in such a way that he may be encouraged to think more and memorise less; a very laudable object which the author's mode of presentation should go far to achieve. The difficulty encountered by the student on commencing organic chemistry is, in part, due to his inability to visualise the configuration of organic compounds; to overcome this difficulty the subject of configuration has been introduced at an earlier stage than is usual in many other text-books of this type, and there is much to be said for this arrangement. A further feature of the book is the attention paid to the more recent practical developments of applied organic chemistry such as the production of oil from coal, power alcohol, and synthetic methyl alcohol—to mention but a few examples. Such treatment of the subject is calculated to stimulate the imagination of the student and the book forms a good introduction to organic chemistry.

Creative Mind.

By C. SPEARMAN, Ph.D., Hon. LL.D., F.R.S., Foreign Member Société Française de Psychologie, Professor of Psychology at the University of London. London: Nisbet and Co., Ltd. 1930. Pp. 125. 5*s*.

Prof. Spearman has added considerably to the scientific development of psychology. Without his theoretical speculations, based upon many years of experimental and statistical research, experimental psychology as applied to education in particular would not stand where it does to-day. The mathematical

psychology of correlation, coefficients, and tetrad difference may seem arid and disquieting topics, but in this book of singular charm and cultural breadth Prof. Spearman has extended his theory of cognition to the field of creative effort in art and scientific discovery. This theory of cognition is based upon the three laws of noegenesis, which state first that a person tends to know his own sensations, feelings, and strivings—a principle of apprehension; secondly, that "when two or more items are given, a person may perceive them to be in various ways related"; thirdly, "when an item and a relation to it are present to mind, then the mind can generate in itself another item so related." The somewhat abstract statements of qualitative and quantitative laws are illuminated by reference to pictorial and plastic art, and without detracting from the artistic merit of works of creative genius the author has certainly not given finality to æsthetic theory, but has established bonds between æsthetics and general psychology. Prof. Spearman always points out how scientific discovery pursues the same mental course as does artistic creativeness, and that everyday behaviour too is bound to these activities by the operation common to all three—the educing of correlates. Many will read these pages with a feeling that artistic creation, discovery, and behaviour need other factors for their explanation than the bare eduction of correlates, but no one will close the book without having had the experience of contact with a singularly penetrating intelligence.

Handbook of Protozoology.

By RICHARD ROKSABRO KUDO, D.Sc., Assistant Professor of Zoology, University of Illinois. London: Baillière, Tindall and Cox. 1931. Pp. 451. 25*s*.

UNLIKE other books on protozoology which have been published in recent years, this one deals very largely with free-living protozoa which numerically are a much larger group than parasitic forms. The parasitic protozoa are given only their fair share of the book without any special reference to their pathological importance. Thus the account of the hæmosporidia, including malarial parasites of man and animals and the piroplasmata, fills six pages, while the parasitic amœbæ and the trypanosomes and their allies are dealt with in 12 and 10 pages respectively. The book therefore is designed more for those who wish to study the protozoa as a group from the general zoological standpoint than for the parasitologist who requires detailed information about disease-producing forms. After a short introductory section follows an outline of classification indexed for reference to the succeeding systematic section which forms the bulk of the book. In this section each group is introduced by a short description, while definitions of orders, families, and genera follow with a brief mention of some of the more important species. Most of the text figures, and these are numerous, depict several organisms, in some cases a dozen or more, so that there is a wealth of illustration which greatly enhances the value of the book. The classification followed is the conventional one, the phylum protozoa being divided into two sub-phyla, plasmodroma and ciliophora, the former including the three classes mastigophora, sarcodina, and sporozoa, and the latter the two classes ciliata and suctoria. The subdivision of these classes agrees in the main with that found in other text-books. Of special interest are the sections devoted to the myxosporidia and the microsporidia, on both of which groups the author is a recognised authority.

The book will be of value not only to the zoologist, but also as a work of reference to medical men and parasitologists who in their dealings with pathogenic species are liable to encounter many non-parasitic forms. It may save them from many errors and will give them a picture of the protozoa as a whole in which the pathogenic forms appear in their true perspective. Prof. Kudo has produced an attractive handbook.

REPORTS AND ANALYSES

ENERGEN FOOD PRODUCTS.

(ENERGEN FOODS CO., LTD., ENERGEN WORKS, WILLESDEN.)

WE have received for examination a number of food materials prepared by this well-known firm. The underlying idea of all of them is to reduce the starch content and to raise the amount of assimilable protein or gluten. In this respect they will serve a useful purpose to those physicians who are concerned in prescribing diets to patients whose carbohydrate tolerance is low. For purposes of comparison the results are given in tabular form.

—	Nutrient pastry flour, rich in gluten.	Macaroni enriched with gluten.	Digestive biscuits.	Endobran biscuits.	Cocoa.
Price	1 lb. = 10*d*.	12 oz. = 1*s*. 6*d*.	½ lb. = 1*s*.	1 lb. = 3*s*. 6*d*.	Per carton = 1*s*. 3*d*.
Moisture (per cent.)	10·8	10·1	3·9	3·9	5·88
Ash (,,)	1·2	1·12	1·48	2·9	4·96
Fat (,,)	3·02	1·74	25·14	23·9	16·74
Protein (,,)	24·94	31·24	23·89	17·15	36·75
Carbohydrates (per cent.)	60·04	55·80	45·59*	52·15†	35·67
Calorie value (per lb.)	1708	1690	2339	2188	2053

* Containing 0·66 per cent. crude fibre.
† ,, 5·90 ,, ,, ,, ,,

Flour.—As ordinary flour contains 11–12 per cent. of protein and 75 per cent. of carbohydrate it will be evident from the figures above that a considerable amount of gluten has been added. This is, of course, reflected in the low percentage of carbohydrate.

Macaroni.—It is stated that this preparation contains over 30 per cent. of protein, a claim which is upheld by the figure quoted. The carbohydrate (starch) content of ordinary macaroni is about 75 per cent., whereas the amount in the Energen brand is some 19 per cent. lower. This increase of protein accounts for the rather dark colour.

Digestive Biscuits.—It will be noticed that in these biscuits the fat and protein contents are very high, and the carbohydrate correspondingly low. The balance between the three principal constituents is well arranged, and the flavour is not unduly rich.

Endobran Biscuits.—These contain a considerable amount of bran-like material which although not of high nutritive value plays a part as a peristaltic agent.

Cocoa.—Since ordinary good grade cocoa powder contains 24 per cent. of fat and 19 per cent. of protein, it will be apparent that the Energen preparation is enriched with a considerable amount of gluten, the fat content being proportionately low.

All of these foods are well prepared and attractively packed. The figures quoted by the Energen Company for the calorie value of their preparations are slightly lower than those we find.

THE LANCET.

LONDON: SATURDAY, JULY 4, 1931.

EPSOM COLLEGE.

In February last the Council of Epsom College issued a questionaire to the governors of the College with the intention to ascertain a collective view on a proposal, advocated by the Council, to abolish the existing method of electing pensioners, scholars, and annuitants. At the present time the results of these elections are determined by the votes of the whole body of the governors. This method in the early days of the inception of the College worked well, but with the increase (and increasing) size of the constituency it has been felt by many no longer to meet the situation with fairness. The risk was seen to be becoming large that the best candidates would not always meet with success, and among the reasons for this opinion one was paramount, when the selection of the foundation scholars was at issue. The friendless child was at a serious disadvantage, while he might be exactly the child whose benefit was intended by the originators of the Foundation. Further prompt help could not be forthcoming while the expensive procedure of collecting votes was going on.

The questionaire met with a response overwhelmingly in favour of a drastic change of procedure suggested by the Council. Votes were recorded by 3862 governors, being over 90 per cent. of the constituency, in favour of the reforming proposal, while only 318 governors voted against it. Having therefore a verdict of nearly 93 per cent. in favour of the change, the Council decided that, after the annual general meeting of the following June, an extraordinary general meeting should be held to obtain authority for the Council to give effect to the wishes of this large majority. The decision of this meeting is recorded elsewhere, and must have given great pleasure to Dr. Raymond Crawfurd, and the existing Council, who have promoted this vital change for the better in the constitution of the College. The resolution authorising the Council to effect the abolition of the present method of election of pensioners, foundation scholars, and annuitants, by the governors and to substitute a procedure of election by a committee appointed by the Council was passed unanimously, a result which was particularly gratifying because the complete concord of view among the governors made it easier for the legislation, necessitated by the change of constitution, to be obtained without expense to the College. The procedure has been made possible by the sympathetic attitude of the Board of Education and the Charity Commissioners.

The new electing body will contain 10 members of the sitting Council, and 10 governors of the College, not being members of the Council. The exact way in which this personnel should be chosen has not been actually decided, and it is a matter which requires some thought. On the principle of general suffrage every supporter of the Foundation had a potential voice in the choice of the beneficiaries, but the outcome of the elections might not reflect the objects which should be in view. The change in the machinery of election by which a small committee is given the responsibility of the whole constituency must lead to a far surer recognition of individual claims, but it will be necessary that the constituency should feel that their responsibility is being exercised by a representative body. The projected scheme, as outlined by Dr. Crawfurd, should meet the case. Under this scheme the 10 members of the selection committee, selected by the governors from without their own body, will represent different interests in different localities upon a rota system, ensuring that the whole constituency will have, as time passes, the particular opportunity of exercising voice.

FURTHER REPORTS ON MUSCLE EXTRACTS.

The claims made for the value of extracts of muscle and other tissues in circulatory disorders [1] are being put to further test. U. S. v. Euler and J. A. Gaddum, working at the Medical Research Institute, have studied the depressor and vaso-dilating action of certain tissue extracts, and the possible nature of such depressor substances. They conclude [2] that at least five different types of such vaso-dilator substances may occur in tissue extracts. These are: (1) histamine, (2) choline and choline esters, (3) substances allied to adenosine, (4) and (5) two hitherto unidentified substances not belonging to any of the first three groups. One such substance which has been called kallikrein is present in urine and pancreas; the other v. Euler and Gaddum have prepared by acid-alcohol extraction from a number of organs such as small intestine, brain, stomach, and bladder. Experimentally it is found that adenosine and its allies slow the heart, whilst kallikrein accelerates it; all these substances appear to lower appreciably the arterial blood pressure in laboratory animals.

Clinical trials of such tissue extracts—"circulation hormones" has been suggested as a name for them—have been extensively carried out on the Continent. A recent questionaire sent by Dr. R. von den Velden to a number of physicians in Germany, Austria, and elsewhere shows [3] a great diversity of opinion as to their therapeutic success. This may be partly owing to the large number of different preparations that have been employed—the most popular being lacarnol prepared from skeletal muscle—and to the different route by which they have been given. The conditions

[1] See The Lancet, March 7th, p. 533.
[2] Jour. Phys., 1931, lxxii., 74.
[3] Deut. Med. Woch., 1931, lvii., 672.

for which these preparations have been principally used have been angina pectoris, high blood pressure, arterio-sclerosis, and peripheral vascular disorders such as Raynaud's disease. It seems legitimate to draw certain tentative conclusions from the results. First, that the action of the various preparations—myotrat, eutonon, myoston, kallikrein, lacarnol, angioxyl, and others—is essentially similar. Secondly, that little or no favourable effect is to be expected from tissue extracts in cases of myocardial weakness or of cardiac irregularity. In spite of a few contrary experiences the great bulk of opinion is that tissue extracts play no part in the treatment of these conditions, and that where digitalis is indicated it should under no circumstances be replaced by these preparations. As regards high blood pressure opinions are very diverse. The majority of clinicians whose opinions are given find little improvement in the subjective complaints. Some record definite lowering of pressure with considerable clinical improvement; others using the same preparation have seen little or no effect. Clearly cases may differ so widely in character and severity as to make comparison difficult. In intermittent claudication there are very favourable reports, as also in some cases of endarteritis obliterans and gangrene of the extremities. In some patients, however, the latter conditions have been made worse by the injections and caution is undoubtedly required in their use in these cases. In coronary disease, and particularly angina pectoris, many speak enthusiastically of these preparations and a favourable influence on them is reported by the majority of writers. Lessening in the severity and frequency of the attacks is the rule, though again a few have noted partial or complete failure. It would seem, however, that occasionally reactions of an unpleasant nature may occur, though more complete purification and removal of protein from the extracts have lessened their frequency.

To sum up, it may be said that these new "circulation hormones" are not entirely without risk, and it is still necessary to urge caution in their dosage and administration. On the other hand, there can be little doubt that in these new organic extracts we have an active therapeutic agent whose precise use and limitation is still to be determined.

PHYSICS: OLD AND NEW.

THE exact sciences have a fascination for the medical man, who humbly accepts the fact, of which he is often reminded, that the biological discipline which he follows is based on less sure foundations. Physics especially attracts his envious attention, since occasionally he is allowed to build, according to his poor capacity, some useful superstructures on the outlying portions of what he believes to be firmly established groundworks. In the past these superstructures were usually carried to a point and then broke down through failure of knowledge on the biological side—as in optics, where the physiological aspects of the mechanism of vision remain obscure. But more recently, in some directions where medical progress depends on a clear conception of physical phenomena this picture has not been forthcoming. For example, clearer differentiation of the physical properties of all kinds of rays emitted in the course of radiotherapeutic measures must precede the acquisition of any exact knowledge of their action on each of human tissues; and the otologists have had to wait long (see the discussion on p. 18) before a standard tuning-fork has been devised.

If one approached in this rather querulous spirit the exhibits displayed on June 23rd by the National Physical Laboratory at Teddington, he could find many targets for quips, but he would be exposing rather his own ignorance of the progress of physics during this century than indicating the claims of the biological sciences to have caught it up. All departments of the laboratory afford examples of the way in which the very methods of applying to practical uses knowledge already gained have suggested other directions in which research must be pursued. This twofold activity characterises nearly all departments of the laboratory and is especially noteworthy, perhaps, in the departments of Aerodynamics and in the William Froude Laboratory. Here the rapid growth of test work connected with ships has necessitated the construction this year of a new tank which, when completed, will measure 678 by 20 feet, being thirty feet longer and ten feet narrower than the Yarrow tank now in use. It is noted that a 30 per cent. reduction in fuel consumption has on occasions resulted from submitting a model of a proposed ship to tests in this laboratory. It is possible, moreover, to determine the force exerted by wind on the deck erections of ships by towing models upside down through water, the erections being attached to a flat-bottomed raft. In this way new arrangements have been designed which reduce the power expended in driving ships against strong winds. Another branch of research in this department is likely to be even more important to shipping. Recent accidents to large vessels on or near a coast have emphasised the need for still further improvements in aids to navigation. One of the most promising methods employed at present is known as the rotating beacon. In this system a continuous transmission is maintained by a shore station, the transmitting aerial rotating uniformly at a speed of one revolution per minute. The transmission from the vertical coil has a narrow beam of silence which rotates with the coil. If the transmission is received on a distant ship, the navigator in the ship can ascertain the bearing or direction of the beacon by measuring the time which elapses between one of the signals and the moment when the beam of silence falls on the ship. An apparatus here exhibited shows how the signal can be received and recorded on a drum which rotates in unison with the beacon, the direction of the beacon from the ship being thus measured automatically. In the Physics department considerable progress is being made in devising convenient ways of measuring sound. On the one hand measurements and analyses are made of the actual energy in the sound waves, and on the other a simple estimate is made of the overall loudness

of the noise as heard by the ear. On a convenient scale of loudness with zero at the threshold of hearing, sounds become painful at about 130 "degrees" above threshold, where each degree, known as a decibel, is approximately the least change in loudness perceptible to the ear. The level of conversational speech is at about 50–60 decibels above threshold. Aeroplane cabin noises are at present in the region of 80–110 decibels above the threshold. Eighty decibels correspond to the level of the noise in a tube train. It is almost impossible to converse in a loudness level of 110 decibels, even by shouting. In street traffic and in ordinary trains the noise ranges from 50–70 decibels above threshold, and efforts are being made to reduce noise in aircraft cabins to such a level.

Far indeed is the horizon of physics envisaged by the National Physical Laboratory from the conception imposed by dogmatic chapters on heat, light, sound, electricity, and magnetism in the elementary text-books of the pre-medical course. We all knew well enough when following this course that the ground would grow more difficult if we pursued the path, but most of us gratefully shut the gate at the place where it let us into the more congenial fields of physiology and anatomy, and never reopened it. This was a mistake which future generations will hardly be permitted to make, since biophysics, younger even than biochemistry, promises to be no less important. At least the newer developments of physics have shown the futility of any attempt to distinguish between the more, or less, exact sciences. All our standards are suffering change, even, may be, the most fundamental. Almost the first thing we learnt in elementary physics was the importance of an arbitrary unit of measurement. The standard yard was defined as the distance at 62° F. between two lines on gold studs inserted in a metal rod under the custody of the Board of Trade. Lest this Imperial Standard should be lost through any cause, as was its predecessor by fire, four replicas were embedded in the masonry of, or kept securely in, various national institutions. Now even this standard is found wanting. At the National Physical Laboratory experiments are proceeding with a view to establishing a wave of light as the universal length unit in substitution for the present material standards represented by the Imperial Standard Yard and Prototype Metre. Apart from the advantages of indestructibility and permanence, the proposed unit is said to offer possibilities of increased accuracy in reproduction and measurement. The work so far accomplished indicates that the yard and metre lengths can be reproduced to an accuracy of about four millionths of an inch, and further refinements of the apparatus are likely to increase the accuracy to one millionth of an inch. Our rejoicing at this possibility is tempered by a regretful glance at the school text-book which first familiarised us with this Imperial Yard, which from something that had seemed to be a natural phenomenon in the home even of a dressmaker or a carpenter became suddenly elaborated into a lesson. Those who are loyal to material standards may take comfort from the fact that nearly 40 years ago A. A. MICHELSON showed that a standard of length might be restored, if necessary, by reference to the measurement of wave-lengths of light, but that the desired degree of accuracy, to a millionth of an inch, has not even yet been, and may never be, achieved.

THE ORDER OF ST. JOHN.

No surviving institution connects the British Empire of to-day so closely with what we regard as the ages of chivalry as the historic Order of St. John of Jerusalem, the English branch of which last week celebrated with fitting ceremonial the centenary of its revival. The "Grand Priory in the British Realm of the Venerable Order of the Hospital of St. John of Jerusalem" traces its ancestry back to the little hostel for Christian pilgrims created by Brother Gerard which Godfrey de Bouillon found in Jerusalem when he captured the Holy City in 1099. From this small beginning was developed a great Order of Chivalry pledged to defend the Christian faith and to serve the sick and poor which eventually became a military power with all the attributes of Sovereignty until it was so smashed to pieces by Napoleon that on the Continent it survives only as a highly exclusive body of Roman Catholic nobles of sixteen quarterings. For four centuries the Order occupied a splendid place in England with its great central Priory in Clerkenwell, the scanty remains of which now once more house it. At the Dissolution it suffered the fate of all other religious houses and it was not until 1831 that it was resuscitated, and not until 1888 that it was established by Charter as the Order of St. John of Jerusalem in England with Queen Victoria as hereditary Sovereign Head and Patron. How much the Order owes to the Royal Family is suggested by the presence at the centenary service in Westminster Abbey last week of nearly a dozen members of the House of Windsor, with the Duke of Connaught, the Grand Prior, at their head. At that service the Archbishop of Canterbury preached a sermon which was accorded the distinction of being broadcast throughout the world. The Order is associated in the minds of most people chiefly with the work of the St. John Ambulance Association which, starting as a teaching body in 1878, developed a decade later into the St. John Ambulance Brigade. The activities of the Brigade in the war, associated with those of the Red Cross, can never be forgotten, and in peace its 70,000 members of both sexes are almost daily doing invaluable work in street and home here and in the Dominions. Almost half a century ago the Order renewed its immediate connexion with Jerusalem by opening the Ophthalmic Hospital on "an impressive site overlooking the Temple" (to use the Primate's words), and here works of mercy are freely extended to men and women of all races and beliefs.

MANCHESTER BABIES' HOSPITAL: ANNUAL REPORT. In 1930 this hospital, which was founded 17 years ago by women doctors and was originally staffed entirely by women, and admits patients ranging in age from a few hours to two years and a half, had 694 in-patients and 688 out-patients, an increase from 466 in the preceding year, and a growth in attendances from 1325 to 2913. Of the in-patients, whose average stay was 53 days, 96 died, the most frequent causes of death being prematurity (29) and broncho-pneumonia (18). The after-care work ensures that the majority of ex-patients are kept in view.

ANNOTATIONS

OFF-DUTY WORK.

AN interesting recommendation was made last week by the central public health committee of the London County Council for the council's acceptance. It has long been the practice in the mental hospitals under the council's control to allow the medical superintendent to hold an appointment unconnected with his office, on such conditions as the council may decide proper. He may, for instance, be physician to an out-patient clinic at a general hospital, and in fact has often been such. Application has now been made for this permission to be extended to medical officers of other types of hospital which have more recently come under the council's control. The deputy medical superintendent of Fulham Hospital has the opportunity of becoming assistant radiologist at the National Hospital, Queen-square; the assistant medical officer at St. Mary (Islington) Hospital would like to apply for the appointment of honorary medical registrar at the Maida Vale Hospital for Nervous Diseases. On his behalf it was stated that the appointment, which would involve attendance on two or three afternoons a week, would be carried out during normal off-duty hours. The committee's recommendation was made in no grudging way. "We are of opinion," they say, "that the staff generally should be encouraged to hold such appointments, as association with outside medical work provides valuable experience which will be of benefit in carrying out their duties under the council"; and the grant of similar facilities is to be customary provided that (1) the appointment is an honorary one, (2) the holding of it shall not interfere with the efficient discharge of the officer's ordinary duties, and (3) the work is done in off-duty hours. The position is interesting, for the question of the employment of off-duty hours in a full-time appointment has provided many conundrums, some of them so difficult of solution as to require the aid of medical defence societies. Broadly speaking, the employer of a medical person cannot prescribe or prohibit any form of unpaid off-duty employment which does not contravene his or her terms of service, and, unless it is expressly stipulated in these terms that no other moneys whatever shall be received by the officer in virtue of his medical qualification, it is difficult to see how the prohibition of payment can be enforced. Where the whole-time salary is on a generous basis, the question of supplementing it will hardly arise, but this is not always the case. The arrangement suggested in London, if it should become general, will result in a liaison between the voluntary and municipal hospitals which must have its effect on the future of both. A possible risk of widespread response to this permission might be to endanger the practice of offering modest honorariums for hospital posts, such as registrarships, to enable young men or women to keep themselves by doing useful routine work while waiting for a vacancy on the staff.

DIATHERMY AS PYREXIAL AGENT IN G.P.I.

SINCE first Wagner-Jauregg brought hope to the black prognosis of general paralysis of the insane, experimentation has been mainly concerned with various ways of producing fever. The essential element in the cures that have been attained has seemed to be the pyrexia induced by the remedial agent, and on the whole the opinion of psychiatrists still agrees with that of the pioneer workers in regard ing the plasmodium of malaria as the best agent. But to give a man malaria is a serious responsibility, and could only be justified by the appalling future before these patients in the absence of treatment and the very considerable measure of control of the pyrexia afforded by quinine. It seems strange that the relatively much less harmful type of pyrexia that can be induced by diathermy has not been more widely tried. Drs. C. A. Neymann and M. T. Koenig[1] have found that it is not only far safer than infective methods but also more successful, especially with depressed patients who are apt to prove more resistant to treatment than the expansive ones. Neymann and Koenig have treated 50 cases selected at random, over half having a duration of from one to five years, and have compared the results of malarial, rat-bite fever, and diathermy treatment. About 20 per cent of the patients had previously been treated with malaria and tryparsamide without appreciable results. The method of administering diathermy was that described by C. A. Neymann and S. L. Osborne,[2] but no patient was given more than 12 treatments. This, the authors say, is not enough, but the work was experimental and they were limited by circumstances. Most patients had between one and two hours' pyrexia of over 103·5° F. after each treatment. The death-rate was 18 per cent. for malaria, 10 per cent. for rat-bite fever, and nil for diathermy. The results with malaria were as good as is usual nowadays; the remissions in rat-bite fever were brief and occurred only in 8 per cent. Diathermy gave 24 per cent. remissions as compared with 22 per cent. after malaria. The criterion of remission is that the patient should regain insight and be able to leave the institution and earn money. Most of the cases only began to show improvement after the eighth or tenth treatment. The improvement rate—short of full remission—was 26 per cent. for diathermy and 22 per cent. for malaria and rat-bite fever. Of seven depressed patients treated with one or other of the fevers, only one showed improvement, while of four depressed patients treated with diathermy two went into remission and the other two were sufficiently improved to be put on parole. The serological changes did not correspond with the clinical changes; some demented cases improved serologically but not clinically, and vice versa. There are no complications in or contra-indications to diathermy treatment, provided the proper electrodes are used and the proper technique is applied, and as many as 50 treatments can be given without ill-effects. The dosage can be measured with scientific exactness, and the method can be applied by any practitioner acquainted with the elements of electrotherapy. The advantages of this method are so obvious and the disadvantages of other forms of induced pyrexia are so well known that if the results obtained by these American workers are substantiated a very great advance has been made in clinical psychiatry

RESEARCH FACILITIES AT LINCOLN'S-INN FIELDS.

THE provision in 1930 of laboratories for research workers in rooms adjoining the Museum at the Royal College of Surgeons is described by Sir Arthur Keith in his annual report as an important develop-

[1] Jour. Amer. Med. Assoc., 1931, xcvi., 1858.
[2] Ibid., xcvi., 7.

ment of the services which the Museum of the College renders to surgery. Hitherto research work has been carried out by the officers of the Museum and by men who found in the Museum material which elucidated the subject of their inquiry. The laboratories now provided are intended to meet the needs of another class of men altogether—young men who aspire to become members of the surgical staffs of our great hospitals.

Four new research scholarships, offering £500 a year for varying terms of years, are being founded, of which the Melchett, the Bernhard Baron, and the Beaverbrook are already in working order, being held respectively by Mr. J. H. Thompson, Mr. E. G. Muir, F.R.C.S., and Mr. H. J. Burrows, F.R.C.S. A fourth scholarship is to be provided from the funds of the College. Mr. Thompson is seeking to isolate the growth-inhibiting factor from parathyroid material. Mr. Burrows is engaged on tissue culture, and Mr. Muir is studying the comparative anatomy, physiology, and pathology of the prostate gland. One of the laboratories has been assigned to Dr. G. Scott Williamson, who holds a Mackenzie Mackinnon Fellowship, and to Dr. Innes Pearce, who is working with him on the nature of the substances secreted by the thyroid gland in health and disease. Voluntary workers who are investigating problems relating to the practice of surgery are also accommodated in the laboratories, as far as space permits, and six of these are at present receiving hospitality. For the convenience of workers an animal hut has been erected on the roof of one of the laboratories, the College having gained recognition as a centre where animal experiments may be performed. These facilities, together with the research farm in the country, of which the plans are set out on p. 39, should give a fresh stimulus to surgery.

STANDARDS FOR SPAS.

HYDROTHERAPY has long been recognised as an important branch of medical treatment and a concise but comprehensive survey of the various waters available is long overdue. When the scheme by which spa treatment will be available to members of approved societies comes into operation, it will be essential for every panel practitioner to possess some knowledge of the spas and their treatments. They will have good cause to welcome the first instalment of an International Register of Spas and Mineral Waters, just issued [1] by the International Society of Medical Hydrology. The desirability of uniform methods for the expression of data led to the appointment four years ago of a standard measurements committee, under the chairmanship of Mr. S. Judd Lewis, D.Sc., which will promote the compilation of national registers of waters to form the basis of an international register. When this is done, accurate and comparable information regarding the spas and their waters will be available for every one interested. In the past analysts have expressed their results in various ways, most of them unintelligible to medical men. In the register a common form of expression designated by the letters "I.S.M." (International Society of Medical Hydrology) is given, but provision is made for the inclusion of the same results expressed in the manner customary in the country concerned and designated as "National." In the British register, the figures will at the outset be given in milligrammes per litre (I.S.M.) and grains per gallon (National). It is hoped that the National form of expression will ultimately become redundant. For the benefit of those who are accustomed to think in terms of salines, instructions are given for the calculation of the most probable combinations of the ions present in such waters and their mode of expression, but it must be borne in mind that all such combinations are hypothetical and arbitrary. Physical data are to be recorded in a standard manner, eliminating for example the confusion that arises when radioactivity results are expressed sometimes as milli-micro-curies, sometimes as Maché units. Standard forms are given for recording geographical, climatological, geological, and topographical data, and the register provides for the classification of the waters according to their chemical, physical, and medical characteristics. Local information will include methods of treatment available, facilities for the investigation of disease, and a list of the diseases and disorders suitable for treatment. There must remain for long enough a great gulf between the precision of the analytical data and of the deductions for treatment based upon these data. Chemical analysis is a science and medicine an art; but without accurate data, treatment will remain purely empirical. Dr. Lewis and his colleagues have provided a sound basis for the superstructure that is to come.

[1] London: Headley Brothers. Pp. 20. 1s.

THE AUSTRALIAN MEDICAL SERVICES IN THE WAR.

A HISTORY [1] of Australian medical coöperation in three very different campaigns during the late war gives a good picture of the gallant fight made against unexpected obstacles on all fronts. Many and grave were the problems of the Australian Medical Corps. On Gallipoli, for example, on April 25th, 1915, it was difficult to land, as is seen in the picture on p. 132 of this history. The narrow beaches and steep rugged hills were hard to climb even for men without equipment while G.H.Q. was so absorbed in the problem of reinforcing an uncertain attack as to have little time for thought for the wounded. Casualties, who had to be brought down the narrow ways impeded the reinforcements, congested the beaches, and awaited hospital ships while it was still doubtful whether ships would not rather be needed to remove an unsuccessful army. But the Navy, less closely involved, lent Neil-Robertson stretchers for lowering wounded down the cliffs and the indefatigable senior medical officer of *London* got many wounded off to the five ships his admiral had detailed. Thus of over 4275 casualties, 3380 were embarked for Egypt on April 26th and 27th. Later, the plague of flies which raised the number of sick all through the summer was followed by the great attack in August, to prepare for which the Australian A.D.M.S had to plead for help in clearing the beaches. Sinai and Palestine provided different problems, in some ways easier. Twice in 1916, at Magdhaba and Rafa, ambulances were recalled because attacks were said to have failed, but the fighting lines, who had not been told they were beaten, went on and won their battles, which was satisfactory enough, but it was hard to pick up their wounded promptly. The strenuous antimalarial campaign along the front in the summer of 1918, especially in the valley of the Jordan, 1280 feet below the sea, tired the troops; but had they known that Liman v. Sanders would later [2] charge his failure to the epidemics of malaria and dysentery, how they would have been

[1] The Australian Army Medical Services in the War of 1914-18. Vol. I., War Memorial, Melbourne, 1930. London: Australia House. Pp. 873. 21s. 6d.
[2] Journal of the Royal United Service Institution, 1921, p. 327.

encouraged! Of the successful cavalry operations in Sept., 1918, every one is aware, but we have not before met so detailed a description of the confusion found by the Australian Force on Oct. 1st in the hospitals of Damascus. They were without food, without drugs or appliances, without staff; all these deficiencies had to be made good in the teeth of two fierce, and by bad luck simultaneous, epidemics of malaria and influenza, which broke out on Oct. 5th. These epidemics immobilised the 4th Cavalry Division in the Lebanon, hardly sparing it enough men to feed the horses; raised the total of Turkish prisoners in the hospital from 900 to 2000; and dealt not too unkindly with a medical unit if it incapacitated a mere half of its personnel. The Australian Light Horse lent 100 non-commissioned officers and troopers, the D.M.S., E.E.F., at Ramleh sent up 100 R.A.M.C. orderlies, and somehow the situation was saved. The Anzac Field Laboratory should be mentioned. Its work was pursued far forward in the danger line, at Aleppo and Aintab, and at Jerablus on the Euphrates; its staff had to deal with cholera, diphtheria, oriental sore, dysentery, and especially malaria, achieving 32,000 examinations in two and a half years, with much travelling as well. It is interesting to read praise of prophylactic quinine; 10 cases of malaria occurred in 10 men thus treated to every 23 in untreated men during May to August, 1918, and subsequently grs. 10 daily were ordered for all troops in the great advance. It is noted that after 10,000 prophylactic treatments at Port Said for venereal disease only six cases of disease were reported; but such good results were far from universal. In New Guinea malaria and dengue were the chief troubles of the Australian force. Here prophylactic quinine was thought to have secured a lessened proportion of blackwater fever. This and other experiences will be discussed in a later volume, which promises to be as interesting as its predecessor.

MEDICO-LEGAL WORK IN PARIS.

A LARGE body of detective fiction has invested the Sureté with a halo of glamour. While possibly no more romantic than any other public service, the Sureté deserves its reputation for efficiency and resource. As Dr. T. H. Blench pointed out in a paper read before the Medico-Legal Society on June 25th, the Sureté is the criminal service of the Prefecture of Police and must not be confused with the Sureté Générale, which comprises the organisation of provincial police and is under the direction of the Minister of the Interior. The *police judiciaire* of the Sureté are guided by the three principles of the division of work, observation, and classification. Work is divided into four brigades. The criminal brigade deals chiefly with murders and important robberies; it is composed of skilled detectives aided by very complete scientific equipment. The brigade concerned with public highways is adept in disguise and languages. The mixed section, which deals with morals and drugs, frequents the theatres and music-halls and is expert in the niceties of evening dress, jewellery, perfumes, motor-cars and American dancing. All these brigades are assisted at need by the Service d'Identité Judiciaire. This department records the finger-prints of criminals and measurements of the body, including those of the skull, the right ear and the left foot, arm, and middle and little fingers. Identification is completed by a note of any scars, nævi, tattoo marks, or other peculiarities. The Service maintains a section the special function of which is the speedy analysis of the circumstances and surroundings of a crime; it includes a photographer, a finger-print expert, and a man whose duty it is to draw a plan of the area. There are also experts in bullets, powder-marks, blood-stains, and forgeries, in the detection of which the ultra-violet ray is of great value. Other uses of the ultra-violet ray are the analysis of substances suspected of being drugs, and the examination of semen stains.

Dr. Blench gave an interesting description of the Medico-Legal Institute of Paris, which is situated some two miles from the Palais de Justice on the Quai de la Rappée, and was completed in 1923. It grew up from the old Morgue, and contains laboratories, post-mortem rooms, facilities for instruction of students, a museum, and a library. It is able to make every kind of investigation on corpses, post-mortem specimens, foodstuffs, and every substance or object that may possess forensic significance. It instructs—besides medical students—post-graduates, magistrates, law students, police officers, and others concerned with the administration of justice. The course comprises coroner's inquests and practical investigation, and candidates are prepared for the diploma of médecin légaliste in the University of Paris. Dr. Blench pointed out that the training made medico-legal instruction in this country appear very meagre. During the ensuing discussion several speakers stressed the advantages that would be derived from the possession of a similar institution in this country. There can be very few medical men who would not profit in their daily experience from a course of instruction and from the constant coöperation of a well-equipped medico-legal institute. It would also facilitate the administration of justice. In our present hand-to-mouth system important investigations are entrusted—sometimes at very short notice—to an expert who has to rely for help far more on his genius and personal contacts than on any kind of permanent organisation. The cost of erection and of maintenance of a medico-legal institute would be considerable, but in the interests of justice the money spent would be well invested.

ANOTHER ANTHELMINTIC.

IT is well established that carbon tetrachloride produces fatty degeneration with necrosis of the liver, and less fully realised that it may also cause marked damage to the kidneys. Lamson and his colleagues [1] stress its third risk, for after study of the records of the International Health Division of the Rockefeller Foundation they have been convinced that it was only after this drug began to be used in hookworm campaigns that there first appeared certain disquieting reports. These related to treated patients who had shown evidence of activation of ascaris. Some only vomited the worms; others died, death being caused by worms blocking the air passages or knotting themselves into a ball which obstructed the gut. The search for a new drug which would avoid these risks led to the investigation of hexylresorcinol. This is a white waxy crystalline substance slightly soluble in water or mineral oil and readily so in alcohol, glycerin, and vegetable oils. Dissolved in olive oil under the name Caprokol, it has been widely used, at least in the United States, as a urinary antiseptic in doses up to 1 g. three times a day, continued for weeks without ill-effect. Lamson

[1] Lamson, P. D., Brown, H. W., Robbins, B. H., and Ward, C. B.: Field Treatment of Ascariasis, Ancylostomiasis and Trichuriasis with Hexylresorcinol, Amer. Jour. Hyg., 1931, xiii., 803.

and his co-workers find that in dogs hexylresorcinol in doses of 0·6 g. may produce no lesions in the stomach, or there may be congestion of its mucous membrane, varying from reddening of small areas to implication of the whole with petechial hæmorrhages. Lesions disappear within 48 hours. But side by side with this congestion must perhaps be put the vomiting which has been induced by giving to children less than 8 years old a dose of 1 g.; it is probably significant that this symptom has been almost limited to those who have eaten shortly after taking the drug. As judged by colorimetric tests, a fraction only of the drug is excreted in the urine, and, indeed, the major part remains in the bowel. The drug is unpleasant to take; the taste is easily disguised in glycerin or vegetable oils, but if this be done anthelmintic efficiency is greatly lessened. Accordingly in the work reported the drug was given in hard gelatine capsules; but these must be freshly filled, since the drug acts on the capsule and renders it unstable. The single doses given varied from 1 g. to 0·4 g.; many of the patients treated were children, and the information is not so arranged that it can be determined whether or not the smaller doses were given to these. It is stated that for adults a dose of 0·5 g. was less effective than a larger one.

The outstanding feature in regard to anthelmintic value lies in the readiness with which the drug combines with albumin and becomes inert. In the intestinal canal this is held to limit its action to the superficial layer of the epithelium, in spite of the vascular dilatation and rupture of blood-vessels which the writers themselves have reported beneath this. At all events the eating of food even five hours before taking the drug lessens its vermicidal power so strikingly that the writers believe, though they do not seem to have tested the matter, that to get the best effects from it nothing should be taken on the previous evening except a little bread and milk. Salts should be taken on rising, hexylresorcinol several hours later, and the first food of the day four or five hours after treatment.

The results of treatment have apparently been assessed on the examination of a two-hundredth of a gramme of fæces, and these workers italicise the point that their results are based on the accuracy of the diagnostic method they used. In ascaris infection treatment has given results in different groups varying between complete disinfestation on the one hand, and on the other a complete failure to disinfest but with a lessened number of worms, the critical factor in this case being the taking of food or the use of an unsuitable vehicle. In hookworm infection the result in fasting persons of doses up to 1 g. was an observed reduction in eggs by about 80 per cent., the obviously uncured varying from about 40 per cent. to about 60 per cent.; while for trichuris infection the observed reduction in eggs in the fasting was about 50 per cent. and the obviously uncured lay between about 50 per cent. and 80 per cent. Owing to the large numbers of eggs passed by a female ascaris it cannot reasonably be doubted that those persons who appeared to be disinfested were actually rid of all female worms. In the case of hookworms and whipworms the real percentage of uncured was undoubtedly considerably higher than the figures suggest, for, if a worm lays eggs at such a rate that one egg is found in a thirtieth or a fourtieth of a gramme, disinfestation cannot be determined by the examination of a two-hundredth of a gramme. The writers add valuable tables which show the estimated anthelmintic efficiency obtained in these infections by other workers with other drugs. It does not seem that hexylresorcinol will displace them by reason of greater potency, particularly in view of the strict and intelligent coöperation which the patient must give before even reasonably good results are obtainable with the anthelmintic.

THE RELIEF OF PAIN IN CANCER OF THE BLADDER.

THE discussion on the treatment of inoperable carcinoma of the bladder, reported on p. 20, brought to light much that is interesting. Everyone who has had to deal with this type of case must have been impressed by the amount of suffering that vesical carcinoma often entails to the patient, and by the inefficacy of present methods of treatment to relieve it. In spite of the advances made in radium therapy it was admitted both by Mr. R. Ogier Ward, who opened the discussion, and by the subsequent speakers that results obtained in inoperable growths of the bladder are disappointing. Although in Mr. Ward's hands the implantation of seeds through a cystoscope has brought relief to a few patients, no case of cure has been reported, and many of the speakers admitted that the more usual practice of transfixing the growth with radium needles has actually increased, rather than reduced, the sufferings of their patients. This failure of radium can in part be accounted for by the special difficulties that exist in eradiating the bladder, but it is probable that this is not the sole explanation. The tendency in radium treatment to-day is to diminish the dose of the element and increase the time over which it is allowed to act. In the treatment of carcinoma of the cervix it has become customary to repeat the treatment after a short interval, and it is possible that were this fractional method to be adopted in vesical carcinoma better results would be obtained. The use of massive doses in an attempt to destroy a growth at a single sitting only results in the production of a sloughing sore and an increase of the patient's discomfort. But whether by improved technique we can ever hope to produce in bladder growths the same satisfactory results as those obtained in cervical or mammary carcinoma is doubtful, and it is important, in the meantime, to explore every possible way of relieving the patient of the worst of his sufferings. For this reason the latter portion of Mr. Ogier Ward's paper, in which he deals with the use of nerve section as a means of abolishing the agonising pain usually associated with inoperable bladder growths, is of special interest. So far, two methods of doing this have been used, namely, chordotomy, or division of the antero-lateral tracts, and removal of the presacral nerves. Of these methods the former is, of course, the more reliable, since it effectually blocks all painful stimuli coming from the pelvic viscera and lower limbs, but as it entails a somewhat severe operation its use must be limited. Destruction of the presacral nerves has the advantage of being a less serious operation and one that can be performed through the same incision as that required for an exploration of the bladder. Although it is difficult on anatomical grounds to explain the rationale of destruction of the presacral nerves it would appear, both from the work that has been done in Germany, and from Mr. Ogier Ward's more limited experience, that the method gives good results, even when the pain is not limited to dysuria. Possibly, as Mr. Ward suggests, the action is an indirect one, due to the alteration in the tone of the bladder wall which

the interference with its nerve supply produces. At any rate the method is one that should be fully tested.

PSYCHOLOGY OF THE EMIGRANT.

EMIGRANTS of all classes desiring to live permanently in Canada must submit to a medical examination prior to embarkation and certain British practitioners have accepted the responsibility of conducting these examinations under a roster scheme. The *Medical Officer* in its current issue quotes a note which is being included in the instructions to these practitioners which is of interest chiefly for the emphasis laid on the psychological rather than on the physical stress associated with a complete change of environment. Not only climatic changes but comparative isolation in outlying districts, change in money standard, food, cooking, and dwellings; complete change in local interests and details regarding social life and activities; difference in customs and routine methods of doing work and business generally, all these tend to produce a period of home-sickness of such severity as to be really disabling. Disappointment may arise, too, from the erroneous idea that less work will produce a better living in the new country. Moreover, the release from the restraining influences of the home environment is often too much for persons lacking in self-control or moral responsibility.

It is held to be of particular importance, therefore, in examining prospective emigrants to detect not only the obvious physical or mental defective, but also those individuals who possess defective judgment, instability of the nervous system, or who are emotionally hypersensitive. This task will be made more difficult by the fact that it is often just these people who have been oppressed by the difficulties of life in Europe and are often anxious to make a new start. They may be unlikely to make good elsewhere, but it seems to us harsh to deprive them of the opportunity. The Canadian government believe, however, that a close and friendly coöperation between the British medical man making the examination and the Canadian medical officer, specially trained in immigration medical work, will mitigate suffering and hardship on the part of the immigrant, as well as relieve the financial burden on Canadian public funds resulting from the physical or mental collapse of new settlers.

TUBERCULOSIS CONFERENCE AT MARGATE.

THE 17th annual conference of the National Association for Prevention of Tuberculosis, held last week at Margate, centred on the child, and that for two reasons. It is realised that the secret of the adolescent peak of tuberculosis mortality is probably hidden in the period immediately preceding adolescence. The raising of the school age will enable much more to be accomplished in protecting the child. The various sessions of the conference were devoted to different periods in child life and the appropriate measures of protection. Some of the papers are briefly summarised on p. 22 of this issue. Sir Robert Philip, whose introductory address while directed to the layman's understanding was yet informative to the medical man, expressed a wish that the tuberculin test should become universal. It was our biggest weapon for discovering that infection had taken place, and the basis of our means for protecting the child. Like other speakers, he thought the case for B C G unproved. Closer liaison was desirable between tuberculosis and child welfare departments, and success was to the community which would search out positive reactors and attend to their environment. Dr. Eugene Opie set out attractively his conception of adult phthisis as a second infection, modified by a partial immunity. By means of stereoscopic X ray films and the tuberculin test, grave pulmonary lesions could be discovered in children long before the disease had produced destructive changes. Two per cent. of school-children between 14 and 18 years of age had, he said, dangerous lesions of the lung parenchyma, although only a quarter of them revealed it by symptoms or physical signs. But the view that adult disease develops from latent disease in childhood did not go unchallenged. Dr. N. D. Bardswell said he had found the development of tubercle in adolescence as a rule independent of any previous history of ill-health; and Dr. Letitia Fairfield regarded the entrance into industry as the determining factor. There was no hint, she said, of increased incidence among secondary school-children; why the resistance fell so precipitately on leaving school was an urgent matter for inquiry. The protection of the child during the pre-school and school years was ably developed by speakers. Dr. Midgley Turner spoke persuasively of the "dilution" of tuberculosis by general education of the public; the open case of phthisis was the crux of the problem. He outlined the Sheffield scheme for isolating the infant of a tuberculous mother for twelve months after birth; others doubted whether parents in this country could be persuaded to adopt the Grancher system. Dr. R. H. Crowley described the newer developments of hygiene in schools, and the changing orientation of our education, which is coming to regard the child as a whole. If the conference has immediate results it will be in the direction of making X ray examinations and tuberculin testing more common among school-children throughout the country, and in measures to prevent infection through the open pulmonary case. On the question of infection through milk, opinions were sharply conflicting.

Dr. J. A. Campbell Kynoch, Emeritus Professor of Obstetrics at St. Andrews University, died suddenly on June 23rd. He was a graduate in medicine of Edinburgh University, and studied midwifery and gynæcology in Berlin, Vienna, Bonn, and Munich. He was the first Professor of Midwifery appointed when the Conjoint Medical School was established in Dundee and for many years was Dean of the Faculty of Medicine at St. Andrews University.

THE death occurred of Mr. Edward Beadon Turner on Tuesday last, June 30th, at his London residence. For five years a member of the General Medical Council, a medical reformer, health-worker, and athlete, he was well known by a great public outside his profession, and his death will be widely regretted. A notice of his career will be published later.

EXTENSION OF DUDLEY GUEST HOSPITAL.—A new wing of the Guest Hospital, Dudley, was opened by Princess Mary last December, and it has now been decided to erect another similar wing containing two main wards and six single-bed wards, providing 54 beds in all. The work will cost £30,000, and to make room for the additional nurses who will be needed the Helen Thompson Memorial Nurses' Home is to be enlarged at the cost of a private donor. Six months' experience of the new wing has shown that the hospital is still inadequate to the demands made upon it, the waiting list having continued to grow.

PANEL AND CONTRACT PRACTICE

THE INFLUENCE OF HEALTH INSURANCE UPON HOSPITAL PRACTICE.*

By T. B. Layton, D.S.O., M.S. Lond., F.R.C.S. Eng.,
ex-chairman, the london insurance committee; surgeon to the throat and ear department of guy's hospital, london.

Those who minister to the health of the people are no longer limited to the profession of medicine. There are those who carry out the treatment we order: the nurse, the masseur, and the electrotherapist. There are those who supply us with the wherewithal to do this: the pharmacist and the instrument-maker. There are those who provide for us the accommodation in which it can be done—the architect, the engineer, and the builder. In each of these branches the work has become specialised. And there is the administrator. If I speak more of him it is not that I give him pride of place, or think him either more or less important than the others, but because his importance has not, as yet, been recognised, especially by the medical profession; and when he is recognised it has often been rather to jeer at his failings than to sympathise with his difficulties and to help him in his work. We live, however, in an age of team-work, and whether one deals with the League of Nations or with the organisation of health insurance the work of each has to be fitted into that of another like the pieces of a mosaic.

Administrators may be divided into: (1) those who deal with the health of the people on wide general principles, in the office of the government of the municipality or at the headquarters of the great charitable organisation; (2) those who work out these general principles in broad detail, in the offices of the hospital, of the treatment clinic, or of the ambulance service; and (3) those who carry out the minute details in close association with the individual patient—the social service worker, the almoner, and the secretary. In the background, over all and yet the servant of all, is he who deals with finance.

Of all this elaborate organisation each unit of the people asks two things: to be kept well when in health, and to be returned to it again when health fails. And if this last be impossible they ask to be relieved of pain and discomfort and to be enabled to carry on with their life's work so far as they can.

The art of keeping the people well is of two parts: the first is public health, the second is personal hygiene. With the first, health insurance does not deal; but in our country personal hygiene has always been reckoned as a part of health insurance. This is inherent in the very first words[1] which Mr. Lloyd George used when, as Chancellor of the Exchequer, on May 4th, 1911, he asked leave of the House of Commons to introduce a Bill to provide for insurance, amongst other things, for the prevention and cure of sickness. It is true that as yet but little has been done under this head; but it remains a part of our national policy and may at any time be taken up.

Treatment when Ill.

The doctor holds the key position to this subject. Up to now the medical benefit in the British Insurance Acts only includes services involving the application of skill and experience of a degree or kind which general practitioners as a class can reasonably be expected to possess. Not that it has ever been the national policy so to limit it. The services to be rendered by the general practitioner were the foundation upon which a complete superstructure could later be built. The National Health Medical Service came into force in Great Britain on July 15th, 1912, but the superstructure has not as yet been added. In the spring of 1914 Mr. Lloyd George proposed an extension of the Insurance Scheme to include specialist and laboratory service, and the money for this was actually voted by Parliament on August 4th, 1914. Then came the great hiatus in the even tenor of our ways, and we have not yet reached a new normal of our national life. The result of this is that our National Health Insurance scheme has never had a normal year in which to work. There were but two years in which to get things going before the world went sick. During later years we have worked at it in a period of the world's convalescence.

So far as the past is concerned, I can find no evidence that in England, or at any rate in London, the institution of the National Health Insurance system has had any material effect upon hospital practice. In their out-patient work the hospitals deal chiefly with patients who need specialist treatment. This was not included in our national health scheme, and it is not surprising that the institution of the scheme has had no influence upon the attendances and work of these departments. The out-patient departments dealing with general medicine and surgery do, however, deal with a certain number of cases which should be included under the work that can be done by the general practitioner. These patients were included among those who could not afford to pay the doctor for individual attendances It is probable that there was some decrease in their number when the national health scheme came into being. The decrease, however, was not great. The scheme applied only to the workers, not to those dependent upon the worker, who made up the majority of such persons attending hospital. Actually the worker could not himself afford to go to hospital; the amount it cost him by the loss of pay for half a day's work was greater than the amount he had to pay to see his doctor in the evening. Even though there was some falling-off in the attendances in these departments, in relation to the whole work of a great institution, such as that which I have the honour to serve, the effect was infinitesimal and has not been felt in the general life of the place. It is, however, probable that to-day the system is having an indirect influence which may be felt but of which no statistics can be gained. I put before you, therefore, various suggestions that are adduced from different quarters.

First it is suggested that the practitioner in charge of the case is inclined at once to send the patient on to the hospital as soon as he realises that he is suffering from some condition that would come under the category of specialist services. It is true that the total number of patients attending such departments—e.g., that dealing with diseases of the nose, throat, and ear—has been on the increase in recent years, but there is no evidence to show that this increase is especially among the insured population and is not explained by the general increase in attention to such diseases among the population as a whole.

* Abridged from address delivered on June 8th at the Second International Hospital Congress held at Vienna.
[1] Hansard, fifth series, vol. xxv., 609.

If such an increase of attendances among the insured population has occurred, it must be credited to the National Health Insurance scheme that these patients are now getting the specialist treatment that they need.

Again we hear it said that when a general practitioner sends his patient to the hospital he loses touch with him and hears no more about him. This resolves itself into the need of some organisation whereby the clerical work of keeping touch between one doctor and another can be put upon a sound basis and it shall not be left to the energies of a tired specialist to write or dictate a number of letters at the end of a long day.

The provision of additional benefits has resulted in a certain sum of money being paid by the approved societies to the voluntary hospitals. This money has been of value to them, but has not had any direct influence upon the practice in these institutions.

Perhaps the most important way in which the Insurance Acts have had an influence upon the practice of our hospitals is that they have influenced the practitioner in sending his patients suffering from some acute disease into these institutions at an earlier stage of the illness. The evidence in favour of this is quite indirect and it may be due to the slow influence of medical education rather than to the Insurance Acts. That cases are less often sent up in advanced stages of acute disease is, however, all to the good.

The Hospital of the Future.

We turn then to the future. Upon this we can have no evidence. We can but indicate the lines upon which we feel things must evolve. Our great philosopher-statesman of the last generation, John Morley, spoke [2] of the three independent provinces of compromise as being "a wise suspense in forming opinions, a wise reserve in expressing them, and a wise tardiness in trying to realise them." He urged that if a subject is not ripe for practical treatment you and I are not, therefore, entirely relieved from the duty of having clear ideas about it.

> "As it is," he added, "everybody knows that questions are inadequately discussed or often not discussed at all, on the ground that the time is not yet come for their solution. Then when some unforeseen perturbation, or the natural course of things, forces on the time for their solution, they are settled in a slovenly, imperfect, and often downright vicious manner, from the fact that opinion has not been prepared for solving them in an efficient and perfect manner."

We may then agree that it is the building of the superstructure of which the general practitioner service was to be the foundation that will have an influence upon our hospital practice.

This superstructure may be expected to consist of three parts: the provision of laboratory services, the provision of consultation and advice by the specialist branches of the medical profession, and the provision of the necessary in-patient hospital treatment in order that this advice may be carried out. We have learnt that the provision of the first two parts was accepted in principle by the British Parliament 17 years ago. Our Ministry of Health has never ceased to consider the subject and to watch for a suitable opportunity to introduce these two services; on the other hand, it has never favoured any scheme of provision of in-patient treatment, primarily because of the prohibitive cost. The provision of laboratory aids to diagnosis and of specialist advice would not be of very great benefit to the insured person were there no arrangement whereby he could receive the necessary in-patient treatment that frequently must be the corollary of such advice. Fortunately in our country things have so evolved that the provision of in-patient treatment under any health insurance scheme has become unnecessary.

On April 1st, 1930, there came into force an Act introduced by Mr. Neville Chamberlain which did away with our ancient poor-law and in doing so transferred all the public hospitals to the care of the county councils. In doing this the Government of the day set out as the policy of the nation that these hospitals should be raised in their equipment and their efficiency to the highest possible standard; and the Government of to-day has shouldered the task of seeing that this is carried out. In the old days destitution was the criterion for admission to these hospitals and had to be proved by anyone applying for admission. Under the new Act "ad hoc" poverty is the criterion for admission and, considering the high cost of in-patient, surgical, and medical treatment there can be none who come under the National Insurance Acts who cannot make this claim.

When National Insurance is extended to the specialist services the man who pays his insurance money will already be paying for the upkeep of these institutions through the rates. He has already the right of admission into them. It is clear that he will not pay a second time towards them by his weekly insurance subscription.

The influence of health insurance upon hospital practice in the future therefore depends upon the extension of the benefit to specialist consultation and laboratory services. There is, however, another way in which insurance may be extended; and that is towards the dependents of the insured people. We may well assume that that has taken a place in our consideration of the future.

These consultations will be held in out-patient departments attached to hospitals or in new clinics specially organised and provided for them. The need for close association between out-patient and in-patient treatment will make it desirable that they should be held in clinics attached to in-patient hospitals. If all those who will come under National Insurance be removed from the present out-patient departments, the activities of these departments will practically have disappeared. At the clinic to which the insured person goes, he will claim that he be not kept waiting too long. At present the amount of time spent in waiting at an out-patient department is so great that many wage-earners cannot afford it. No attempt is as yet made, by organisation and appointment, to limit this time of waiting. When the insured person has paid by his subscription for his attendance, he will be able to insist upon an attempt being made to shorten his wait. He must not expect too much. It is impossible for a doctor to stick rigidly to a schedule; one patient may take him an hour, the next two or three may take but a quarter of an hour each; or, alternately, two or three successive cases may need each an hour's attention. The doctor who makes appointments at half an hour's interval and never gets behindhand is not usually a good doctor, and some degree of waiting must be expected towards the end of a session.

Next the insured person may claim that if the doctor in the out-patient department says he must come into the hospital, he should not be kept waiting unduly long. Some delay must happen in all but acute cases, but the long waiting-list of to-day, whereby some patients wait for a year or more,

[2] On Compromise, Eversley edition, pp. 94, 95, and 99. London: Macmillan and Co.

must become a thing of the past and the period of waiting be reduced to a month at the longest. Here again he may lose something by improved organisation. Speaking as a surgeon, I find that the long waiting-list, if used properly, is the finest sieve whereby to sort out those cases that really need operation from those in whom I have advised it unnecessarily. I find that those who fall to the bottom of the waiting-list and have been on it for more than six months include nearly all of the latter, and a further examination will often make me advise against the operation of which I had previously been in favour.

The best way, however, of preventing operations being advised unnecessarily will be by the third point on which the insured person will insist: that is, that the amount of time allotted to the consideration of his or her condition shall not be less than a certain minimum. There is no more potent cause of operations being advised unnecessarily than a hurried examination. Again I speak with the experience of one in charge of an out-patient clinic where more persons attend than I can adequately treat. The minimum period will vary for each type of clinic and must be somewhat elastic, but within certain limits it will be necessary to keep to it.

These three demands my supposed worker will ask for his dependants as well as for himself; but the next applies to him (or her) only. It is that the clinics shall be held at an hour at which he can attend. This will mean the institution of evening sessions.

Next he may demand that if his complaint entails admission to hospital he shall be admitted under someone in whom he has confidence, who will usually be the physician or surgeon that he has seen at the out-patient clinic, or someone in close touch with him. This will mean that the out-patient department must be a part of the same institution as the in-patient clinic, not that it need be on the same site. It is probable that in big cities we shall evolve along the lines of out-patient clinics and admission blocks in the centre of the town with the in-patient hospital on the outskirts. The telephone and the ambulance have made it unnecessary to have the two together, but it is still necessary that the same doctors should be in charge of both. This question of keeping in touch will become more and more important as time goes on. The specialist must keep in touch with the general practitioner as well as with his brother specialists, and all with the various persons who carry out the treatment prescribed. To this end, members of the clerical staff must be attached to each out-patient clinic under the doctor in charge of it. Such an arrangement is already in existence in London in association with the care of school-children. It works very well indeed; and may be taken as an example from which a similar organisation may be planned for adult clinics.

The Question of Certification and the Education of the Student.

There is in England to-day an anxiety as to the finance of our National Health Insurance, because so many more people than previously are claiming sickness benefit. Of the various causes for this, one is said to be that doctors are not strict enough in the way in which they issue the medical certificate which is the key to this benefit. If this is so, it is very probable that the greatest abuse comes from certificates given in the out-patient departments of hospitals. I suggest that this problem may be solved by the authority that pays the sickness benefit providing the clerical staff to do the duties of liaison indicated above.

The treatment of the next generation depends upon the education of the doctors in this. Students before and after graduation cannot be taught unless there are patients about whom to teach. It is, therefore, in the interest of all that all should present themselves as cases for education. It is often suggested that when the people pay for their own treatment, instead of being dependent upon charity, they will resent being talked about. I do not believe this will be so. In an experience of teaching of a quarter of a century I have hardly ever found a patient who has objected to my teaching. Nurses, students, and personal friends who have been under my care have always been willing to allow me to exemplify my teaching by their condition. Private patients are always willing to be demonstrated to colleagues. There is no reason that any one should object if the teaching is kind; and it should be recognised that anyone attending a National Insurance out-patient clinic or going into any State or municipal hospital should do so on the understanding that they may be an object-lesson in teaching should the authorities think it necessary.

We have seen at every turn how the question of finance crops up. It must dominate all hospital administration in the future as it has done in the past. We may well say that the health of the nation is so important that no expense should be spared in maintaining it. That is so, but we must equally remember that there must be no waste. We have the contrast on the one side between expenditure and wasteful extravagance, and on the other between economy and stinginess. This struggle must always go on, and always the pendulum will be on the swing from one side to the other. So also with the pay of all concerned. The health of the individual cannot be treated purely as a business concern, and everyone who enters the service of the sick must be prepared to give more than is exactly in the bond. The labourer is worthy of his hire; but we must also remember the parable of the talents. We must be prepared to give account of what is entrusted to our care, or it will be taken from us. This must apply to the administrative staff as well as to the medical and nursing professions to an extent that perhaps is not realised enough.

These principles raise as matters of detail other problems. For instance, do we need two types of hospital to-day—the voluntary and the State? If we do, how is the work to be distributed between the two? If we do not, how are the voluntary hospitals to be absorbed under the State without a dislocation of their work? In our country insurance is national and any development must be on national lines. One thing only I demand: that is the care of the patient. So long as the treatment is good, he will not mind whether he goes into a hospital that is under the direct control of the central government, of the municipality, or of some individual organisation. This care will depend in the future upon efficient administration. The moment medicine passes from the hands of the individual to the team, administration becomes necessary. Administration means regulations, and these must be drafted to fit the diseases from which man suffers. His illnesses cannot be changed to fit the regulations. In carrying out these rules the widest elasticity must be allowed. No code can be drawn up to fit every person's illness. The doctor must be prepared to ride through every regulation in the interest of his patient if he thinks it necessary. In this he has a great responsibility,

for if he fails to do so he may be brought to account. But when he does it he must justify his action and show good cause. The power to shoulder this responsibility is a necessary adjunct to his professional skill. Knowledge alone never made a good doctor. Character also is essential.

INSURANCE PRACTITIONER AND SICKNESS CLAIMS.

REFERRING to Memorandum 329/I.G. issued by the Minister of Health, summarised in our issue of June 13th (p. 1311) and commented on in our issue of June 20th (p. 1370), Dr. J. C. G. DICKINSON (Braunton, N. Devon), writes: "There are certain important factors which largely vitiate the accuracy of the conclusions drawn by the Ministry from their figures. In the first place we are not informed as to the average period of sickness before reference by the approved society, nor of the degree of unemployment in the areas chosen for the compilation of statistics. In areas where unemployment is very great the tendency is to remain on the higher paid dole rather than to go on to the lower paid panel pay, and in these areas certification will tend to appear more satisfactory. No information is given of the number, if any, of cases referred to regional officers by panel practitioners, and of the results. It is agreed apparently on both sides that cases of great difficulty arise. I purposely avoid the term malingerer. But let it be asked: Have the regional officers been found capable of facing up to these very difficult cases? Personally I think not; and are they as negligible in effect as the Ministry appear to think? If one such case is let slip in every panel practice in the country, the total number may be small—some 20,000 in all—but their influence on fellow-patients is very great.

"What remedy is suggested? I suggest that regional officers might show greater courage in dealing with these very difficult cases. Further, when a panel patient referred by his society is found not to be incapable of work by the regional officer, or if the panel practitioner considers the man fit for work and the regional officer decides he is unfit, then in each case the patient be automatically removed from the list of the panel practitioner—the patient to have the right to apply to be retaken on the panel of the doctor concerned. In order to tighten up certification and maintain the standard of private practice it is necessary that the patient should have free choice of doctor, but also that the doctor should equally maintain the right to refuse or discard a patient."

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED JUNE 20TH, 1931.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 62; scarlet fever, 1393; diphtheria, 877; enteric fever, 30; pneumonia, 566; puerperal fever, 46; puerperal pyrexia, 92; cerebro-spinal fever, 47; acute poliomyelitis, 6; encephalitis lethargica, 11; dysentery, 14; ophthalmia neonatorum, 109. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on June 23rd-24th was as follows: Small-pox, 138 under treatment, 2 under observation (last week 152 and 3 respectively); scarlet fever, 1101; diphtheria, 1409; enteric fever, 13; measles, 140; whooping-cough, 429; puerperal fever, 33 (plus 7 babies); encephalitis lethargica, 202; poliomyelitis, 2; "other diseases," 158. At St. Margaret's Hospital there were 14 babies (plus 6 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 2 (1) from enteric fever, 26 (0) from measles, 1 (0) from scarlet fever, 17 (5) from whooping-cough, 24 (3) from diphtheria, 38 (5) from diarrhœa and enteritis under two years, and 20 (3) from influenza. The figures in parentheses are those for London itself.

The fatal case of enteric fever outside London occurred at Sheffield. Only one death (under 1 year) from meningococcal meningitis was reported in London. Six deaths from measles occurred in Leeds, 4 in Sunderland, and 3 in Birmingham. Diphtheria claimed 3 victims each at Manchester and Rochdale.

The number of stillbirths notified during the week was 331 (corresponding to a rate of 48 per 1000 births), including 52 in London.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

Surg. Lt. (Emerg.) R. Schofield to be Surg. Lt.-Comdr. (Emerg.).

The following appointments are notified: Surg. Comdr. E. C. Holtom to *London*; Surg. Lt. J. L. Cox to *Victory* for R.N. Barracks.

ROYAL NAVAL VOLUNTEER RESERVE.

The following appointments are notified: Surg. Lt.-Comdr. A. S. Bradlaw to *Victory* for R.N. Barracks; Surg.-Lts. R. M. Buchanan and J. F. Heggie (proby.) to *Frobisher*.

ROYAL ARMY MEDICAL CORPS.

Lt. S. M. Burrows to be Capt. and remains secd.

ARMY RESERVE OF OFFICERS.

Lt.-Col. R. C. Wilson, having attained the age-limit of liability to recall, ceases to belong to the Res. of Off.

Capt. W. S. C. Copeman from R.A.M.C., T.A., Res. of Off., to be Lt.

TERRITORIAL ARMY.

Capts. W. Baxter, G. V. Davies, and C. W. Dudley, to be Majs.

Capt. A. J. Will (late R.A.M.C.) to be Capt.

Capt. R. P. S. Kelman, New Zealand Medical Corps, to be Capt.

Lt. C. L. Broomhead to be Capt.

Lt. A. R. C. Higham, from 92nd (5th Lond.) Fd. Bde., R.A. (T.A.), to be Lt.

H. F. Wattsford (late Cadet, R.A.F.), to be Lt.

TERRITORIAL ARMY RESERVE OF OFFICERS.

Capt. W. S. C. Copeman relinquishes his commn. on appt. to the Supp. Res. of Off.

INDIAN MEDICAL SERVICE.

Lt. (on prob.) B. Temple-Raston to be Capt. (on prob.) (prov.).

ROYAL AIR FORCE.

E. K. Pritchard is granted a temporary commission as a Flying Officer.

Flying Officer W. J. Cumming, relinquishes his short service commission on account of ill-health.

AUXILIARY AIR FORCE.

T. E. Cawthorne to be Flying Officer, No. 601 (County of London) (Bomber) Squadron.

MENTIONED IN DESPATCHES.

Maj. M. P. Power, R.A.M.C., has been brought to notice for distinguished services rendered during Operations on the North-West Frontier of India during the period April 23rd to Sept. 12th, 1930, by Field-Marshal Sir William Birdwood late Commander-in-Chief in India.

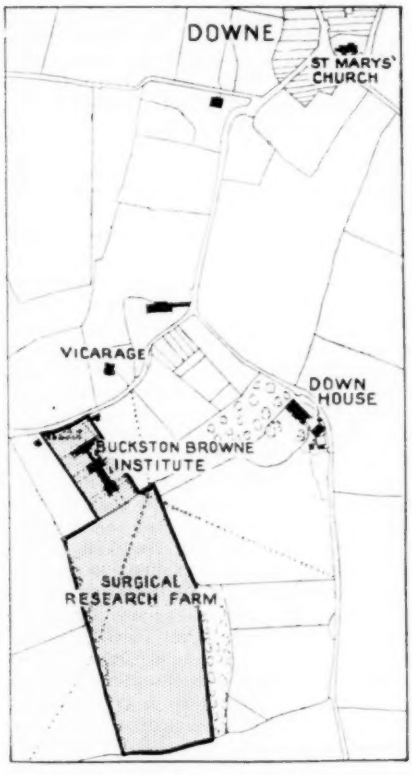
OPENING OF NEW COTTAGE HOSPITALS.—On Friday last week Prince George formally opened a cottage hospital at Newquay. The building is paid for but is not to be opened to patients until enough money is in hand for a year's working; for this another £500 is needed.—Also last week Lord Mildmay, of Flete, Lord-Lieutenant of Devon, opened an extension of the Victoria Cottage Hospital at Sidmouth. The enlargement, which has cost £15,000, increases the number of beds from 14 to 30, including a small provision for paying patients.

SPECIAL ARTICLES

THE BUCKSTON BROWNE SURGICAL RESEARCH FARM.

THE foundation-stone of this research institute will be laid by Lord Moynihan at Downe, Farnborough, Kent, on July 8th, at 4 P.M. It will be recalled that early this year the Royal College of Surgeons of England received from Mr. G. Buckston Browne the means to build, equip, and endow a biological station in the country for the purpose of experimental surgical research. In this year's annual report on the museum of the College by its conservator, Sir Arthur Keith, an account is given of the way this benefaction, which will ultimately reach a sum of £100,000, is being spent. The site selected was one in the parish of Downe, Kent, adjacent to the grounds of Down House, where Darwin lived for 40 years. This house had previously been purchased for the nation by Mr. Buckston Browne as a memorial to Darwin and the acquisition of an adjoining site, for the biological station had the advantage of preserving the amenities of Down House. The site selected for the research farm is 16 miles from Charing Cross, and can be reached in 45 minutes by train and car. The institute to be built on this site is to provide (1) a series of suitable animal houses and huts; (2) experimental laboratories as efficiently and cleanly equipped as operating theatres of hospitals, with sick wards attached; (3) a residential block to provide accommodation for research workers and for the men in charge of the buildings and of the animals.

The Buckston Browne Surgical Research Institute.



Sketch-plan showing the site of the Research Farm.

Provision of comfortable residential quarters for the research workers is an essential part of the scheme, since it is believed that to bring together under a common roof a group of men, chosen from various hospitals and bound by a common object—that of advancing the resources of surgery—should do much to weld together the surgical enterprise of London and of the provinces. The residential block has been designed by Mr. E. C. Frere, F.R.I.B.A., on the lines of a Kentish farmhouse, and his design has been approved. The other parts of his plans—i.e., experimental laboratories and wards, and animal houses—are still under consideration. The buildings are to be as modest as is compatible with fulfilment of the purpose they are to serve, and as much as possible of the capital will be preserved to provide an income for the upkeep of the farm, and to furnish young surgeons with the equipment and material needed for their research. The supervision of the work carried on in the laboratories of the College and at the research farm will be entrusted to the conservator of the museum.

EPSOM COLLEGE.

AN extraordinary general meeting of the governors of Epsom College was held on Friday last, June 26th, at the Royal College of Physicians of London, Viscount Burnham, President of the College, presiding. The object of the meeting was to consider, and, if thought fit, pass the following resolutions:—

That the Council of Epsom College be and is hereby authorised to promote legislation to amend, extend and repeal the provisions of the Royal Medical Benevolent College Act, 1855, and the Royal Medical Benevolent College Act, 1894, so far as may be requisite or convenient for the following purposes, that is to say:—

1. To effect the abolition of the present method of election of Pensioners, Foundation scholars and Annuitants by the governors of the College, and to substitute therefor election of Pensioners, Foundation scholars and Annuitants by a committee to be appointed by the Council and to consist of 20 governors, of whom ten shall be members of the Council and ten shall be governors (not being members of the Council) whom the Council shall select annually as most adequately representing the varied interests of the medical profession.

2. To provide for the extension of the benefits of the charity so as (*a*) to enable pensions to be provided for medical women (but not for their widowers unless such widowers are otherwise eligible) on the same conditions as

for medical men; (*b*) to render the sons of medical women eligible for election as Foundation scholars on the same conditions as the sons of medical men; and (*c*) to enable annuities or occasional pecuniary assistance to be provided for medical women or their families (but not for their widowers unless such widowers are otherwise eligible) on the same conditions as such annuities and assistance may be provided for medical men or their families.

The first resolution, revising the method of election, was proposed by Dr. Raymond Crawfurd, chairman of the Council, who said that Epsom College was administered under two Acts of Parliament, an Act of 1855, and an amending Act of 1894. By the 1855 Act it was decreed that the selection of beneficiaries should be by the governors, who in turn were the subscribers and donors. The purpose of this was to secure funds for maintenance. This, he said, had been done, but with a measure of success not adequate to the complete relief of destitution in the profession. "The Council have for years," he continued, "been anxious to abolish the voting system, and this spring decided to ascertain the views of the governors by circulation of a questionaire to all the 5500 of them. The result was that close on 93 per cent. voted for abolition; the percentage would have been much higher had it been practicable to give a detailed statement of the exact method of replacing the voting system. The reason why the Council have not taken action before is that they could not face the expense of passing a private Bill through Parliament." This difficulty had been surmounted, he added, by the very friendly attitude of certain public Departments who have undertaken jointly to submit to Parliament the necessary legislative changes as part of their annual parliamentary scheme. Admitting that the Council had been anxious as to the amount of pecuniary support they would lose by the abolition of the general vote, Dr. Crawfurd added that they believed their loss would be small, and even hoped that the more democratic method for the selection of beneficiaries in future would attract a larger number of supporters. If the resolution were passed the selecting body, he said, would be ten members of the Council and ten governors not members of the Council; they would be appointed, as a rule, by other medical bodies at the invitation of the Council, and all parts of the country successively would obtain a direct voice.

The resolution was seconded by Dr. H. B. Brackenbury, and was passed unanimously.

Dr. Crawfurd then proposed the second resolution which would provide for the extension of the benefits of the Foundation to women on the same terms, with one reservation, as those now enjoyed by men. He pointed out that the exclusion of medical women and their children from the benefits of the Charity was due to the fact that in 1855 medical women did not exist in this country, and in 1894 they were still looked at askance. But with women admitted to the profession on equal terms with men it became manifest that their exclusion was an anomaly and an injustice. Such was the change in the position of medical women by 1931 that the proposal for the inclusion of them and their children in the benefits of the Charity was carried by a unanimous vote of the Council.

The resolution was seconded by Dr. Brackenbury, and here also a unanimous vote was recorded by the meeting.

ELECTIONS.

The following were the results of the annual elections which were announced at the annual general meeting which immediately preceded the extraordinary meeting:—

Pensionerships.

	Votes.
Marin, Mrs. Edith M.	3523
Shortridge, Mrs. Louisa	3467

* Hadlow pensioner. † Ordinary pensioner.

"Morgan" Annuity.

	Votes.
Waring, Miss S. Annette	3342

Foundation Scholarships.

	Votes.
Ring, Charles A. S.	12,436
Hyde, Edward K.	10,856
Purnell, James A. W.	10,672
Smith, Hugh F. S.	10,411
Evans, Raymond F. G.	9614
Reid, Alexander P.	8398
Walker, Robert G.	7075
Armitage, Raymond S.	5738

UNITED STATES OF AMERICA.

(FROM AN OCCASIONAL CORRESPONDENT.)

PASTEURISATION UPHELD.

THE tendency to question the full nutritional value of pasteurised as compared with raw milk, shown in Prof. Stenhouse Williams's letter to your columns,[1] is evident also in this country but has not received official encouragement. The conference of State and Provincial Health Authorities of North America, which met recently in Washington, heard a report from its committee on milk, which roundly affirms the continued belief of health authorities in America that pasteurisation has no significant deleterious effect upon the nutritional value of milk. In the first place the report of the committee on milk production and control of the White House conference is endorsed as being the result of "an extended study and investigation of all phases of milk in its relation to the public health." The latter report states[2]:—

> Health authorities should recommend to American milk consumers that the general market milk be pasteurised before it is consumed, either in a properly supervised pasteurisation plant or at home.

The health officers' committee then proceeds to take up two recently published papers which appear to discredit pasteurisation and to criticise them in detail. The second of these papers is the article by Mattick and Golding, published in your columns on March 21st (p. 662). The committee states that these authors' conclusions are not justified by the experimental results, the difference in weight gained between the animals fed with heated and raw milk being, in its opinion, too small to be significant. The committee then presents abstracts of research, including that reported by Dr. Janet E. Lane-Claypon to the Local Government Board, which seems to show that heating milk does not destroy its nutritive value. The committee is anxious that further research of an authoritative character be undertaken, especially upon the effects of feeding raw and pasteurised milk respectively to young of the human species. It seems that during last year 39 epidemics in North America were traced to milk-borne infection. Only one of these was attributable to pasteurised milk, the milk in this case having been infected by a carrier after pasteurisation.

[1] THE LANCET, May 30th, p. 1211.
[2] White House Conference (1930). New York: The Century Co., 1931, p. 129.

NEW YORK MUST BURN ITS GARBAGE.

For many years New York City has disposed of its garbage by loading it into scows which are then towed out to sea and the garbage dumped some forty miles from the shore. Even so it is not wholly lost, and New Jersey's coastal resorts have suffered by the drift borne upon them by shoreward winds and ride. The State of New Jersey summoned the City of New York before the Supreme Court. The defence of the city was a plea that the garbage was being dumped beyond the three-mile limit. This defence was set aside by the court as "of no importance." The court has now ruled that New York must stop dumping garbage at sea within a "reasonable time." Plans are being pushed forward for the building of 15 new garbage incinerators at an estimated cost of over 17 million dollars. The cost of incinerating garbage in this country varies from 26 cents per ton at Florence, S.C., to 5 dollars per ton at Providence, R.I. The cost of dumping garbage at sea has been only 23 cents per ton.

THE COFFEY-HUMBER CANCER CURE.

Not long ago Dr. W. B. Coffey and Dr. J. D. Humber were presented by a wealthy New York lady with an estate on Long Island whereon to erect a cancer research laboratory. The New York Board of Social Welfare has given them permission to have a laboratory there on condition that they treat no patients with adrenal cortex extract. The Californian doctors are apparently not satisfied to have a laboratory on these terms. Their lawyer is expected to ask the Welfare Board for a new hearing.

CORRESPONDENCE

A MATERNITY SERVICE.

To the Editor of THE LANCET.

SIR,—On reading the letter of Prof. F. J. Browne (p. 1422) one wonders where he gained his comprehensive knowledge of municipal hospitals. As one responsible for the work of a municipal general hospital, in which the council proposes to build a new and enlarged maternity department to replace the existing one, I must feel an object of attack by Prof. Browne. I do not regard the policy of the council as "utterly reactionary" but, on the contrary, as an important step towards safer midwifery. On the present staff "really trained and efficient people" are available, grading down from the visiting obstetrician—a university clinical lecturer and a Fellow of the Royal College of Surgeons, England—who is in complete clinical charge; through the senior resident obstetrician—a Fellow of the Royal College of Surgeons, Edinburgh—who, prior to his appointment had been for over two years senior resident and obstetric tutor in a teaching maternity hospital; to the ordinary resident medical staff, who come to the maternity department after periods in the medical and surgical wards. The staff carries on a tradition of successful midwifery of many years' duration. In 1930 there were 1453 confinements.

The teaching of midwifery is not perfect. One dislikes to use the tu-quoque in controversy, but sometimes it is argument. Has Prof. Browne never known of the appointment to the honorary staff of a voluntary hospital of a man or woman who has never filled a resident position in a maternity hospital, and is it not significant that Dr. Bethel Solomons should think it necessary [1] to warn the general practitioner that when he wants a consultant on midwifery he should find out if the latter is really a practising obstetrician? The attempt to divide doctors into "municipal" and "voluntary" is rather ridiculous. All doctors have worked at some time in voluntary hospitals, and most of them are willing to accept service under a municipality. One type of hospital does not command a monopoly of expert knowledge and skill.

We seem to be quite agreed that the proper place for a maternity hospital is in a department of a general hospital. No doubt we shall continue to differ on the question as to whether it is to be under municipal or voluntary management. This point will probably be decided by local conditions. I am confident that under municipal control there will be no difficulty in securing an efficient staff, and that this staff will be willing and able to do its part in the training of future consultants as well as of general practitioners.

I am, Sir, yours faithfully,

HENRY H. MACWILLIAM,
Medical Officer, Walton Hospital, Liverpool.

June 29th, 1931.

[1] See THE LANCET, June 27th, p. 1384.

FATIGUE IN THE CINEMA.

To the Editor of THE LANCET.

SIR,—With reference to Mr. Savin's article on this subject in your last issue (p. 1433), in my experience the chief discomfort has been due to the relative lighting in the stage and auditorium. When the auditorium is very dark many suffer with headaches and discomfort, which is entirely removed when the auditorium is better lighted. The same can be noted in a card-room. When the room is lighted by lamps over each small table many will complain of headaches, which cease when a large central light is used as well. In both these cases the trouble is caused by defective stimulation of the periphery of the retina.

I was consulted by a patient who had been mountaineering for a month in Switzerland. On returning to his office he found that he had the greatest difficulty in reading, though he concentrated the light upon his work. He was completely cured on being told to have the remainder of the room as brightly illuminated as possible.

There is no evidence that the rods are percipient elements, but all the facts point to the conclusion that they are the nerve elements regulating the sensitiveness of the photo-chemical film.

I am, Sir, yours faithfully,

F. W. EDRIDGE-GREEN.

Board of Trade, June 27th, 1931.

SYPHILIS AND YAWS.

To the Editor of THE LANCET.

SIR,—Space would not permit me to give the entire "dozen ways" of showing the ancient European ancestry of syphilis. I will refer to one direct and one indirect method of proof.

A. Corn. Celsus (30 B.C.–A.D. 38), Lib. VI., XVIII., 2, speaking of the genital organs and specifically of phimosis, says, in part, "after overcoming the resistance of the prepuce" (one may almost sense the reduction en bloc) "there are seen ulcers that are situated upon the glans, or the prepuce, or on the penis beyond the glans, some of these are clean and dry while others

are moist and purulent." Now the only common ulcers of the genitals that are clean and dry are Hunterian chancres, and the only ones that are moist and purulent are chancroids and mixed infections. (See E. Lancereaux "A Treatise on Syphilis," vol. i., p. 13.)

Knowing that the Greeks called what we name flat condylomata by their word for fig, σῦκον, and that the Romans simply translated this into *their* word for fig, "ficus," and used it for the same lesions, we turn now to the same Roman author, Celsus, Lib. VI., III., and, admitting that none of the ancients knew the connexion between genital lesions and constitutional disease, may read with understanding the author's words on sycosis. "There are also ulcers similar to fici called by the Greeks σύκωσις. The flesh overgrows: this indeed is usual. Under this are two varieties. One ulcer is hard and round; the other moist and irregular. From the hard one a sticky material exudes: from the moist more and of a bad odour. Both may be in those parts covered by hair but the hard round variety usually comes on the beard, the moist generally on the scalp." There is much more here than barber's itch and kerion Celsi. The fact that the author uses to describe these face lesions the same term "fici" as was in general use at that time to define condylomata between the nates shows that he was describing a condition quite well known to "us tropical frambœsiologists." In this connexion see "The Epigrams of Martial" (Lib. VII., 71), in which the author pokes fun at his victim with a play upon the word "ficus." Martial (43–104) was a layman and not bound by the medical ethics of his day.

Now for the item of inductive proof. At the present time it is recognised that aneurysm requires for its production the special type of mesarteritis produced by *Treponema pallidum* alone. This applies to arteries with lumina no greater than 1 mm. in diameter. Ligation for aneurysm has been a common practice since the time of Galen (131–201). Garrison in his admirable "History of Medicine," fourth edition, page 109, says in connexion with ligatures for this and other surgical purposes that there was a special shop on the Via Sacra where they were to be bought. Antyllus, a contemporary of Galen, perfected a technique for the ligation of aneurysm which held the field down to the time of John Hunter (1786). Da Costa recommends the Antyllus method for certain aneurysms even at the present time.

Now if the Romans showed enough aneurysms to make it possible for surgeons to develop such a worthy technique of cure as that of Dr. Antyllus it seems reasonable to think that *Treponema pallidum* was getting into their blood *somehow*, and it is our firm belief that it was through the "clean dry genital ulcers" described by Celsus.

I am, Sir, yours faithfully,

C. S. BUTLER,
Washington, D.C., June 4th, 1931. Capt. (M.C.), U.S. Navy.

To the Editor of THE LANCET.

SIR,—It must be obvious that there is little to be gained by further correspondence upon this subject; the problem is too big a one to thrash out in these columns. Any reader of THE LANCET who has the time and opportunity of studying the literature of the subject *and* the diseases themselves, with care in interpreting the terms used and in deciphering the sequence of manifestations, and with due regard to the sources whence the older writers derived their information and to the general trend of medical opinion of their times, must form his own opinion. He may find himself unable to come to a definite conclusion in regard to the relationship of yaws and syphilis, but I have little doubt he will agree with me that sibbens (and other outbreaks of disease mentioned by me in a previous letter) was certainly not yaws, but was epidemic, for the most part non-venereal syphilis, not always non-sexually acquired as Dr. Burke asserts.

I must, however, allude to a previous letter by Captain Butler to correct a statement which he makes in regard to my criticism of Lancereaux, an eminent syphilologist who had never seen yaws. I had said "Lancereaux was not even aware that *pian* and *yaws* referred to the same lesion." Lancereaux's words are: "There afterwards appear in different parts of the body, in pian little red pimples, in yaws papules and pustules, which soon became covered with uneven crusts beneath which are more or less extensive ulcers"—thereby distinguishing wrongly, pian from yaws, though grouping them together as belonging to the domain of syphilis, this idea being based upon the garbled accounts of frambœsia he had received and the false belief that the disease was transmitted hereditarily. I suggested that Captain Butler had been unhappy in the sources of his inspiration in regard to yaws. Later he has cited Huxham, Sydenham, and Buchan as "aware that yaws was simply non-venereal syphilis." Does Captain Butler really subscribe to such a view? Has anyone in this country seen an extra-genital chancre followed by a typical eruption of yaws? May I take this opportunity of asking any of your readers who has at any time under his observation a case of syphilis exhibiting what has been termed a frambœsiform syphilide, to give me the opportunity of seeing the case.

Captain Butler has also been unfortunate in following Jonathan Hutchinson in his opinion in regard to the case reported in THE LANCET thirty years ago. Hutchinson was guilty in just the same way as older syphilologists, as was pointed out by Patrick Manson in the discussion. I think I might go further and suggest that Captain Butler appears to have been equally unfortunate in his clinical material. In a recent paper (International Clinics, 1930, vol. ii.), he figures a Javanese child exhibiting (let me say for the benefit of those unacquainted with yaws) the *common* absolutely typical eruption of frambœsia; but his own note about the case reads: "This is what is called for by text-books in their definition of yaws, but is rarely seen." If Captain Butler will study the disease in Africa or the Dutch East Indies he will be surprised to see the disease, apparently unfamiliar to him, as recognised and described by clinicians as a clinical entity, whatever its relationship to syphilis may prove to be in the future. He will then understand why I suggested that the "dualists" would have good reason in throwing the onus of proving them wrong upon Captain Butler, a suggestion which appears to have caused him pain.

I am, Sir, yours faithfully,

Wimpole-street, W., July 1st, 1931. HUGH S. STANNUS.

ACUTE RHEUMATISM FOLLOWING TONSILLITIS.

To the Editor of THE LANCET.

SIR,—I have read with especial interest Dr. Sheldon's paper in your issue of June 20th (p. 1337). It is of enhanced value in that the observations were all made on children already in hospital and who were therefore under close supervision the whole time.

The conclusions agree very closely with those of previous workers. A point of great interest is the so-called silent period between the previous sore-throat and the subsequent attack of rheumatism. This was first pointed out in your columns [1] by Dr. J. M. H. Campbell and myself, when we found the period to be 5 to 25 days, the majority falling 7 to 14 days after the initial tonsillitis. This has been confirmed by Dr. B. Schlesinger [2] who demonstrated a period of 10 to 21 days, and now by Dr. Sheldon who found a period of 9 to 25 days. The period seems to me to be of very great importance as it bears largely on the aetiology of rheumatism. Dr. Sheldon and Dr. Schlesinger believe this is a period of sensitisation, and to quote Dr. Schlesinger's words "the rheumatic patient is in a hypersensitive state from the tenth to the twenty-first day after the antigenic throat infection, at any time during which a reaction in the form of acute rheumatism is liable to occur," comparable to the sensitisation produced by a dose of serum with its subsequent fever, rashes, and joint pains. Dr. Sheldon now goes a stage further and states "that the rheumatic reaction, whether arthritic or cardiac, has no more claim to be considered infectious than has, for example, post-diphtheritic paralysis." I am sure this is an unwarranted conclusion. A patient with no previous heart disease, or with old quiescent disease, develops a severe carditis 9 to 25 days after tonsillitis, as Dr. Sheldon himself admits. Surely he does not suggest that this is not of infectious nature. There is no evidence of this type of reaction after serum, and anyone who has seen the vegetations on the heart valves and compared them with subacute bacterial endocarditis cannot fail to see the resemblance between the two.

This same silent period can occur after other infectious diseases of childhood. Dr. Schlesinger found a similar silent period between the initial sore-throat of scarlet fever and the onset of scarlatinal rheumatism, and in our original paper we quoted cases of rheumatism following after a silent period, after scarlet fever (five cases), pneumonia (five cases), chicken-pox (two cases), measles (three cases), &c. In other words, rheumatism can occur after any illness liable to produce a state of lowered resistance in the child; and tonsillitis is one of the commonest and most neglected causes of this. In this connexion the work of Dr. A. Osman on scarlatinal nephritis seems of particular value. Working with Dr. Close, he has shown [3] that after an attack of scarlet fever there is a lowered alkali reserve in the blood which reaches its lowest limit on the twentieth day after the initial sore-throat, that is at the same time that scarlatinal nephritis sets in. It appears that in cases in which this fall in alkali reserve is small the nephritis is absent, and if it be prevented by giving enough alkali, the incidence falls from 4·7 per cent. to 0·4 per cent. There is also a fall in alkali reserve following tonsillitis, although this factor does not seem to be of especial importance in rheumatism.

I am sure that if we can obtain an insight into the biochemical factors associated with the lowered resistance of the patient during this silent period, we should go a long way towards preventing the onset of rheumatism. Probably the present system of treating a patient with tonsillitis by keeping him away from school for only two to three days contributes to the onset of acute rheumatism and any rheumatic patient who develops tonsillitis should be considered a sick person for at least three weeks.

I am, Sir, yours faithfully,

E. C. WARNER.

Devonshire-place, W., June 20th, 1931.

[1] THE LANCET, 1930, i., 61.
[2] Arch. Dis. Child., 1930, v., 411.
[3] Guy's Hosp. Rep., 1929, lxxix., 14.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS.

HEALTH SERVICES IN SCOTLAND.

ON Thursday, June 25th, the House of Commons went into Committee of Supply on the Scottish Estimates. Sir R. YOUNG, Chairman of Committees, was in the chair.

Government's Statement.

On a vote of £1,607,203 for the salaries and expenses of the Department of Health for Scotland, Mr. W. ADAMSON (Secretary of State for Scotland) said the largest item in the estimates was that for housing, which was 65 per cent. of the total. Since the State subsidy was introduced in 1919 a total of 121,019 houses had been built with State assistance up to May 31st this year. The shortage of houses still remained somewhere about 100,000, so that they had a long way to make up before the people of Scotland could be said to be reasonably housed. Ever since the present Government came into office a steady endeavour had been made to stimulate local authorities to renewed housing activity, and to restore the confidence which had been destroyed by the action of the late Government in reducing the State subsidy. Those efforts were now meeting with some measure of success, but no one could rest satisfied with the present situation. Representatives of the local authorities had been interviewed with the object of securing further progress, but unfortunately a number of local authorities had failed to appreciate the need for improved housing, even when in some cases it had been urged upon them by their officials. Parliament had vested the Central Department with power to step in where a local authority failed to do its duty, and it was well for him to speak frankly on this matter. He had given definite instructions to the Department that further pressure was to be applied, and, if necessary, compulsory action taken against the defaulting local authorities. If the 47 local authorities who had not yet submitted statements under the Act of 1930 made provision adequate to the needs in their areas he thought they could look forward to an average of something like 20,000 houses a year for the next three years. This would make a very substantial contribution to the rehousing of the Scottish people.

DROP IN SICKNESS BENEFIT.

The outstanding fact about the work of the National Health Insurance Scheme during 1930 was perhaps the drop in payments for sickness and disablement benefit. The amount paid out by the approved societies was less per member than in any year since 1925. The continued unemployment, which was affecting the income of approved societies from contributions, affected the relief coming from reduced expenditure on sickness benefits. In any effort to stop leakage of funds the utmost care must be taken that sick persons got the benefit to which they were entitled, and that they were also provided with the medical advice and attendance that they required at the proper stage. During 1930 some new forms of medical records were introduced and a system by which the Department would receive details of all

sickness among insured persons. Sufficient time had not elapsed in which to compile complete results which would justify some generalisation. The preliminary reports which had been published in the annual report of the Department were merely tentative and should be read as no more than samples of the kind of information and sickness statistics that the Department would be able to furnish once this new scheme was in complete working order.

THE CHANGE OVER.

The change in the administration of the poor-law under the Local Government Act, 1929, took effect on May 15th, 1930. In the administrative schemes which the new Act required the local authorities to submit for his approval the majority provided that assistance in the form of maintenance and treatment of mental defectives, provision for the health of expectant mothers, nursing mothers, and children under 5, the care of blind persons, and provision for the feeding, clothing, and treatment of school-children would be taken out of the poor-law. Progress was being made in many areas in Scotland to improve and extend water-supplies and drainage facilities. Dealing with the medical services, Mr. Adamson said that measured by the death-rate, 1930 had been a very healthy year. Although some death-rates had risen—cancer for example, some infections and maternal mortality very slightly—the local death-rate was only 13·2 in 1930 compared with 14·5 in 1929. The deaths of infants were 83 per 1000, lower than the recorded rate for any year with the exception of 1923, which was 78·9. The tuberculosis death-rate was also very satisfactory—88 per 100,000 compared with 94 in 1929. This rate of 88 compared with 124 per 100,000 in 1920—a very fine achievement. For the first time since 1920 the birth-rate had increased. The possible harm that the continuance of unemployment might do to the health of the people had been a real cause of anxiety not only to the Department, but to many others who took a keen interest in the health and welfare of the people. During 1930 the Department, on his instructions, carried out a special investigation involving over 100,000 school-children in Edinburgh, Glasgow, Dundee, Aberdeen, and Lanarkshire, and its results seemed to justify the broad conclusion that the social services were warding off the worst effects of this period of difficulty. The report of the investigation would be published. Although on many points the material for drawing conclusions was slender, the figures showed that on the whole, on beginning school life, and even on leaving school, children were now better clothed, were cleaner and suffered less from malnutrition, rickets, and defective teeth. That meant a positive advance in the capacity of the citizens of the future.

ADEQUATE HOSPITAL SERVICE.

Another subject to which the Government were devoting special attention was the development of an adequate hospital service in respect of beds, buildings, and quality of service. It was an urgent problem, and now that the local authorities had had a year since they took over the duties of parish councils, and were invested with the new powers conferred upon them, they would be expected to go forward with a policy which would at least end the old and inexcusable differentiations between the standard of treatment in poor-law hospitals and that in, say, fever hospitals, or in the ordinary voluntary general hospitals. There should be only one hospital standard which would be open to all. The estimate for investigations concerning the causes of diseases had been increased this year from £100 to £2500. It was intended that the scientific advisory committee would guide these investigations, and he looked for a large return from this proposed small expenditure. There were some people—and they were particularly vocal at present—who criticised the social services and spoke and wrote glibly of cutting them down, but he thought that the condition of the country would be wretched indeed if it could not maintain the services for which these estimates provided and which were fundamentally necessary in a civilised State.

Criticisms of the Statement.

Sir J. GILMOUR said he hoped that when next they came to discuss these estimates the Secretary of State for Scotland would be able to tell them exactly what progress had been made with slum clearance under the Act of 1930. He was glad that the right hon. gentleman and his Department, speaking with authority, admitted that in the main the changes which had taken place under the Local Government Act, 1929, appeared to be advantageous. He agreed with Mr. Adamson that one of the most important things to-day was to see that the health treatment of those who came under the poor-law should be on a different and better footing than in the past. One of the first and most elementary steps to bring that about was the step taken under the Local Government Act. He welcomed the announcement that there would be a continuous effort to coördinate scientific research in health matters in order that the results of the scientific research might be brought quickly to the notice of local doctors, and those who had to deal with the problems of health at first hand. He urged the Secretary of State to increase and improve the health services in the great cities and in the outlying parts of the country where men and women were working with devotion and skill—such as, for example, the hospitals in Orkney and Shetland, and in the Hebrides.

THE NEW MACHINERY.

Mr. SCOTT said one of the most satisfactory parts of the report of the Department of Health was that which showed that tuberculosis was being stamped out. There was, however, one less satisfactory set of figures—namely, those in regard to infectious diseases. The average number of cases of enteric fever over a period of ten years was 535, whereas in 1930 the figure was as high as 766. The average figure for diphtheria over a period of ten years was 8907, whereas the figure for last year was 11,580. He would like to have an explanation of these alarming increases. It had been suggested that the cause might be impure water supply, and he would like to know whether the Department endorsed that view. He reserved his judgment in regard to the change in machinery under the Local Government Act. He was far from being satisfied, notwithstanding what the report of the Department of Health said, that the changes in regard to the poor-law would be permanently beneficial. He was afraid that there had been thrown upon the scrapheap a vast number of experienced men and women who had formerly given their expert services to the administration of the poor-law. He questioned whether, to a large extent, the new machinery was not even now breaking down. The work was being handed over more and more to paid officials. It was very desirable that there should be some inquiry into the working of the new Act, and he hoped that a commission would soon be appointed for that purpose.

BLACK PATCHES.

Mr. R. W. SMITH said, on the whole, there was a marked improvement in the vital statistics of Scotland, but there were still one or two black patches which could be removed by administrative methods. One of these was maternal mortality, which was rather distressing, because more care was taken of expectant mothers and of the children than ever before. Yet unfortunately the mortality figures were not falling as they ought to do. The Secretary of State had informed the Committee that new forms of medical record were to be instituted in the case of sick persons and he (Mr. Smith) suggested that they should also be supplied in cases of maternal mortality. The great trouble arose from puerperal sepsis, and it seemed to him that by greater care something could be done to prevent the frequency of such cases.

The report of the Department of Health stated that these cases might be prevented if doctors, midwives, and maternity nurses were to make a wider use of masks and adopt more careful antiseptic treatment for the hands. It was also suggested that in hospitals there should be bed isolation by means of metal and glass screens. If the statistics of maternal mortality were classified into smaller groups they would be able to note the number of deaths in institutions, the number of deaths in the patients' homes attended by a nurse or by a doctor, and the number, where patients were nursed in their own homes, attended by a midwife. That would give them some idea where the poison came from. A country doctor had informed him recently that he found that fever cases went wrong in the cottages than in nursing homes. It was his opinion that the septic germ was not in the cottages but in the nursing homes, and that there was more likelihood of the germ being passed from one patient to another in institutions and nursing homes than in cottages where there were clean and healthy conditions, and the germ did not exist. He thought there was a large amount of reason in that. In the matter of medical attention the new Local Government Act was extraordinarily useful, because it coördinated all the medical services from birth until the child was of school age. Something more, however, might be done in looking after the children between the ages of 1 and 5 years, because the report stated that children were fairly well looked after up to one year.

HARDSHIP IN THE HIGHLANDS.

Mr. MACPHERSON said in the rural parts of Scotland the population was very sparse and often a doctor lived 20 to 25 miles from some of his patients. He asked whether the Department of Health was assisting or intended to assist the sparsely populated localities, where it was difficult to get the minimum number of telephone subscribers, to get a telephone service installed so that the poorest people might be brought into quick touch with a doctor. He had had case after case brought to his notice of a patient dying, or being driven almost to the point of death, because it took half a day to get into touch with a doctor. The local medical practitioner in the Highlands was very often a man of great skill in medicine and in surgery. In his tours through the Highlands he often went into doctors' houses, and he found that what was specially needed was a small additional room where patients might wait, or which, in an emergency, might be used even for a slight operation. If the Secretary of State would consult his medical advisers they would agree that an extra room of this kind in the doctor's house was greatly needed.

Mr. MACQUISTEN supported Mr. Macpherson's plea for greater telephone facilities throughout the Highlands and Islands of Scotland. He wished that the Secretary of State would impress on his medical officers the need for preventive methods. The dental deterioration in the younger generation to-day was entirely due to unsuitable foods and the sophisticated, devitalised and preserved stuff which the people now ate.

Mr. MCGOVERN said Mr. Macquisten had mentioned the great amount of ill-health due to tinned foods and white bread. The real trouble, however, was that the people were often not able to consume any decent food whatever. Bad housing and overcrowding, especially in the industrial areas, was one of the greatest factors together with malnutrition contributing to ill-health among the population of Scotland. If they were going to improve the health of the people in the slums, the rents of the new houses must be the same as those from which the slum-dwellers were taken.

DEPRESSION IN TRADE.

Major ELLIOT said they found from the report of the Department that a section taken out of the 1,850,000 insured persons in Scotland showed a lower morbidity-rate this year than in previous years, and that was a matter upon which they ought to congratulate themselves. One of the important factors in this connexion had been the absence of an influenza epidemic such as those which had repeatedly occurred in previous years. That was one of the important reasons for the drop in the payments of sickness benefit. The tuberculosis returns were one of the most obvious ways of telling whether the public health was good or bad, and the figures had fallen to a point never touched before. Infantile mortality had also fallen to a point never reached before. The special inquiry by the Department of Health into the health of the children of unemployed persons showed that they were not suffering. Indeed, the health of the people of Scotland was being maintained remarkably well. But the lesson of this report was that depression in trade and industry were the things that were really holding back the country from the progress which they desired it to make.

Government's Reply.

Mr. WESTWOOD (Under Secretary of State for Scotland), replying to the debate, said that Dr. Smith, of the Aberdeen Health Department, had been awarded the Nichols Prize of the Royal Society of Medicine, which was given every three years, and he had given the Government very valuable assistance in connexion with medical research. With regard to enteric fever and diphtheria the investigations of the Department of Health had shown, unfortunately, that it was most difficult to trace the source of infection, but they were continuing their investigations. If there were any particular cases of lack of telephone facilities in sparsely populated areas to which Mr. Macpherson desired to draw particular attention they would be inquired into and, if it was possible, assistance would be given. The question of an additional room in doctors' houses seemed to be quite worthy of consideration, and would be looked into by the Department.

CARE OF MATERNITY.

The Duchess of ATHOLL drew attention to a matter which was insufficiently emphasised in the report—namely, the extension of the maternity and child-welfare schemes in the rural areas. There might be many reasons for maternal mortality, but all medical opinion was agreed that one of the chief reasons was the want of more antenatal care. The presence in these districts of nurse health visitors would be a very important factor. The report brought out the need for antenatal care from the point of view of the health of the newly born child. Only one-third of the mothers of Scotland received antenatal care, and that was not at all a satisfactory position. One of the first things to be done for health in Scotland was to ensure that every county possessed a district nursing association.

Miss LEE said she was very troubled by the following statement which she found in the report of the Department of Health: "Maternity homes are intended for normal confinements but, owing to the shortage of maternity hospital accommodation, they have been used to some extent for abnormal cases, for which, however, they are neither adequately equipped nor staffed." She felt bound to bring this point again before the Committee, because women in her own constituency had complained that there was a scarcity of hospital places in the west of Scotland for abnormal cases where there were particular medical difficulties present. She thanked the Secretary of State for the work he had done for nurses. She had brought to the right hon. gentleman's notice cases where nurses in public institutions were being underfed and certainly overworked. She begged that the good work which the right hon. gentleman had begun in this matter should be continued. There was great need for its continuance because she was far from satisfied with the condition of things in the voluntary hospitals.

The vote was withdrawn.

BILLS ADVANCED.

In the House of Lords on June 30th the Bethlem Hospital (Amendment) Bill passed through Committee without amendment and was reported to the House. The Sentence of Death (Expectant Mothers) Bill was read the third time.

HOUSE OF COMMONS.

WEDNESDAY, JUNE 24TH.

Medical Referees.

Mr. STEPHEN asked the Home Secretary the names of the medical referees on the panel for workmen's compensation cases in the city of Glasgow; the number of claims heard by each during the last year; and the number of cases in which each medical referee certified the workman fit for light or ordinary work.—Mr. CLYNES replied: Following are the names of the medical referees appointed under the Workmen's Compensation Act, 1925, for the Sheriffdom of Lanark, which includes Glasgow, and the number of cases referred to each of these referees during 1930 under Section 19 of the Act.

General Referees.—Dr. John Barlow, 134 cases referred; Sir George Thomas Beatson, M.D., 156; Dr. John Marshall Cowan, 14; Dr. George Henry Edington, 147; Dr. James Livingstone Loudon, 139; Dr. Ralph Stockman, 144; and Dr. Archibald Young, 115.

Specialist Referees for Ophthalmic Cases.—Dr. John Gilchrist, 116; Dr. John Rowan, 111; and Lieut.-Colonel Hugh Wright Thomson, M.D., 91.

Specialist Referee for Cases of Industrial Disease (except Ophthalmic Cases).—Prof. John Glaister, M.D., 23.

As regards the information asked for in the last part of the question, I have no official figures, and any comparison between the different referees on this basis would, in my opinion, be most misleading and could serve no useful purpose.

Tuberculosis in the Navy.

Sir NICHOLAS GRATTAN-DOYLE asked the First Lord of the Admiralty the incidence of tuberculosis amongst naval ratings serving with His Majesty's vessels at sea; and whether he had any information as to the circumstances in which 13 new infections were notified in H.M.S. *Warspite* since the vessel was recommissioned.—Mr. ALEXANDER replied: The answer to the first part of the question is approximately 3 per 1000. In spite of careful investigation, no definite reason has been ascertained to account for the relatively high incidence of pulmonary tuberculosis in *Warspite* during 1929. It can only be assumed that it was due to fortuitous circumstances which is borne out by the fact that in 1930 only one case occurred in this ship.

Experiments on Living Animals.

Mr. FREEMAN asked the Home Secretary whether any record was kept of the details of experiments on living animals which were mere repetitions of previous experiments and therefore useless for purposes of research; and, if not, whether he would consider the desirability of keeping such a record, to be published in his annual report, or of prohibiting such experiments altogether; and (2) whether any record is kept of the number and details of experiments on living animals performed for demonstration purposes to students or for similar reasons; and, if not, whether he would consider the desirability of keeping such record and publishing this information in his annual report.—Mr. CLYNES replied: I propose to answer this question and the next together. I am not aware of any experiments which are mere repetitions of previous experiments, except the experiments performed not for purposes of research, but for demonstration to students—i.e., experiments under Certificate C. The number of these experiments is given each year in the report prefixed to the annual return. Special provision is made for these experiments by Section 3 of the Act, and I have no power to prohibit them. It is impracticable to publish details of experiments in the annual return.

THURSDAY, JUNE 25TH.

Disposal of London Refuse.

Mr. MUGGERIDGE asked the Minister of Health how many local authorities in Essex had made bye-laws regulating the dumping of house and trade refuse in their respective areas; whether he was aware that the Metropolitan borough councils still dumped their refuse in large quantities in South Hornchurch; and when he proposed to introduce legislation for the disposal of London's refuse on lines consonant with public health and amenity.—Mr. GREENWOOD replied: By-laws on this subject were made by Barking urban district council some years ago and confirmed by the department. Orsett rural district council have made by-laws but these have not yet been confirmed. Other authorities in Essex are preparing by-laws. I am aware that large quantities of refuse are still being dumped in South Hornchurch. As regards legislation, I am not at present in a position to state when legislation will be introduced.

Public Health Instruction by the Cinema.

Mr. MANDER asked the Minister of Health what steps were being taken to make use of talking films for the purpose of giving instruction in hygiene, mothercraft, &c.—Mr. GREENWOOD replied: Cinematograph films are frequently used by local authorities and voluntary bodies for the purpose of giving instruction to the public on matters connected with health and mothercraft, but I understand that very little use has so far been made of talking films for this purpose.

Graded Milk.

Mr. HURD asked the Minister of Health if he would give figures to show the progress of the graded-milk movement during the past few years; if he was satisfied with this progress; and, if not, what further means he proposed to encourage public confidence in the purity of milk supplies.—Mr. GREENWOOD replied: The table appended to my reply shows the numbers of producers of Certified Grade A (tuberculin tested) and Grade A milk in England and Wales in each of the last five years. The figures also show that there has been a steady increase in each grade, but that the number of producers of graded milk is still very small compared with the total number of milk producers in the country. I am considering the last part of the question in consultation with the Minister of Agriculture and Fisheries. The following is the table referred to:—

Milk (Special Designations) Order, 1923. Producers' Licences (England and Wales).

Date.	Certified.	Grade A (T.T)	Grade A.
March 31st, 1927	121	150	266
,, 1928	141	188	361
,, 1929	150	217	462
,, 1930	159	224	524
,, 1931	174	238	582

Mr. BLINDELL asked the Minister of Health, whether he would issue regulations requiring that all animals tuberculin-tested for the purpose of the Milk (Special Designation) Order of 1923, and which reacted to that test, should be branded before sale in order that persons who might subsequently purchase the animals might be aware of this fact.—Mr. GREENWOOD replied: The adoption of this suggestion has been considered on previous occasions and has been held to be undesirable. In any case, I do not consider that it would be expedient to make any such requirement in regard to the limited number of animals comprised in herds to which the Special Designations Order applies.

The Census 1931.

Mr. CHARLES WILLIAMS asked the Minister of Health when the results of the recent census would be known.—Mr. GREENWOOD replied: The preliminary report of census results for England and Wales is nearing completion, and should be published by the first week in July.

Government and Vaccinatio

Mr. WINTERTON asked the Minister of Hea whether he had considered the resolution sent to him fro the citizens of Wigston, near Leicester, where twin children recently died after vaccination, calling for the abolition of vaccination; and what steps he proposed to take.—Mr. GREENWOOD replied: I have received the resolution referred to in the first part of the question. As regards the second part, I have recently published a comprehensive review of the present position regarding small-pox and vaccination, and I propose to await the results of the recent transfer of the administration of the Vaccination Acts to the public Health authorities before considering the question of further legislation on this subject.

MONDAY, JUNE 29TH.

Change of Panel Doctor Procedure.

Mr. MILLS asked the Minister of Health if, in view of protests as to the working of the revised change-of-doctor procedure in national health insurance, he would say how many insurance committees had refused to adopt the new procedure; and whether he contemplated any revision of the procedure in view of the disparity of choice it imposed upon the panel patient as against the private patient.—Miss LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: The change of procedure to which my hon. friend refers was effected as from April 1st by the Medical Benefit Amendment Regulations, 1931, which were

laid before Parliament on Feb. 17th. The first part of the question does not, therefore, arise; and the answer to the second part is in the negative.

Small-pox in India.

Mr. FREEMAN asked the Secretary for India the number of deaths from small-pox which had occurred each year in Calcutta, Bombay, and Madras respectively since the year 1924.—Mr. WEDGWOOD BENN replied: The following table gives the figures of small-pox deaths for which my hon. friend asks:—

Town or municipality.	1924	1925	1926	1927	1928	1929	1930*
Calcutta	316	3,923	934	2,860	558	393	1,831
Bombay	1,231	565	476	841	595	1,126	1,562
Madras	196	762	60	32	246	503	181

* Provisional figures.

TUESDAY, JUNE 30TH.

Foo-supply at Shieldhall Fever Hospital.

Mr. MCKINLAY asked the Secretary for Scotland, if he was aware that patients from the Partick district of Glasgow, until recently inmates of Shieldhall fever hospital, had complained of the food supplied and that the wards were infested with vermin; and what steps he proposed to take to have the matter rectified.—Mr. WESTWOOD (Under-Secretary for Scotland) replied: I have no knowledge of complaints by patients who have recently been in Shieldhall Infectious Diseases Hospital in regard to the food supplied, which is drawn from the same sources as that supplied to other institutions under the Public Health Department of Glasgow. As regards infestation of the wards with vermin, I am informed that certain portions of the hospital have for some time been invaded by small red ants, which established themselves in the kitchen and along the ducts of certain of the wards. Substantial repairs to the kitchen have resulted in their disappearance from that area, but up till now efforts to eradicate them from the ducts of the wards have not been so successful. It is hoped, however, that further improvement will be effected by measures which are being taken under the direction of a medical officer who has had special experience in connexion with insect pests.

Workmen's Compensation in Mauritius.

Mr. MCSHANE asked the Under-Secretary for the Colonies the reasons why, in Mauritius, the Workmen's Accident Compensation Act, although it had received the Royal Assent, had not yet been put into operation.—Dr. SHIELS replied: The position as regards the Workmen's Compensation Bill in Mauritius is that its consideration was deferred during the final session of the last Council of Government for various local reasons. The Bill was reintroduced at the opening of the new Council in May, and is now awaiting its second reading, the discussion on which was expected to take place to-day.

MEDICAL NEWS

University of Cambridge.

At recent examinations the following candidates were successful:—

THIRD EXAMINATION FOR M.B. & B.CHIR.

Part I., Surgery, Midwifery, and Gynæcology.—R. J. V. Battle, H. E. Blake, E. Bradbury, A. B. Carter, G. T. Cook, A. H. Dunkerley, K. V. Earle, G. R. Ellis, C. D. Evans, C. L. Ferguson, T. C. Gipson, D. R. Goodfellow, H. F. Green, G. W. Hall-Smith, A. S. Herington, J. Howell, J. Hughes, J. T. Irving, N. M. James, L. P. Jameson Evans, R. A. Jones, A. W. Langford, A. Lister, B. F. Longbotham, J. V. Lucas, G. C. Martin, F. C. Mayo, D. A. Metcalf, A. K. Monro, J. G. More Nisbett, G. G. Mowat, R. W. C. Murray, W. H. Mylechreest, C. R. L'E. Orme, J. L. Parker, G. T. Partridge, C. G. Roberts, I. C. Robertson, E. Sharp, N. Stevens, R. A. Sykes, J. E. J. Thomas, G. M. Tickler, A. B. Waters, M. Westwood, C. E. R. Wood, and A. H. Zair.

Part II., Physics, Pathology, and Pharmacology.—C. P. Bailey, G. N. Bailey, J. S. Barker, L. T. Bond, C. C. Bryson, H. S. Buckland, G. F. Carey, A. B. Carter, C. L. Collins, G. T. Cook, J. H. Cyriax, A. Eckford, W. A. Fell, D. R. Goodfellow, F. T. Hobday, J. T. Irving, G. D. Kersley, C. R. T. Lane, D. L. Lewis, J. W. S. H. Lindahl, G. G. Ludgater, E. H. W. Lyle, D. B. McGavin, J. M. Matthew, C. W. Morley, W. M. Niblock, R. G. Orr, J. L. Parker, J. Petro, W. H. Poole, H. E. W. Robertson, M. H. Salaman, G. H. Sanderson, W. W. Sargant, P. G. Scott, J. Sowerbutts, J. H. Spence, T. C. Stamp, E. T. W. Starkie, H. C. Stewart, J. W. Summerhayes, A. W. Vaisey, J. G. Vincent Smith, E. D. Ward, G. W. Whittall, L. K. Wills, T. D. G. Wilson, C. H. Wrigley, and R. H. Young.

Hospital of St. John of Jerusalem.

The King has sanctioned the following promotions in and appointments to the Venerable Order of the Hospital of St. John of Jerusalem:—Knight of Justice: Col. Sir James Purves-Stewart. Knight of Grace: Col. the Hon. Murray MacLaren. Commanders: Maj. Sir Thomas Houston, Dr. E. A. Chill, Sir P. Horton-Smith Hartley, Lt.-Col. H. J. Barnes, Dr. R. Clegg, Dr. F. N. Kay Menzies, Surg.-Vice Admiral Sir Arthur Gaskell, and the Hon. J. H. King, M.P. Officers: Lt.-Col. G. E. Peacock, Lt.-Col. G. Mackie, Capt. A. C. W. Knox, Dr. W. E. Thompson, Dr. A. Wilson, and Sir Squire Sprigge. Serving Brothers: Dr. W. Lee, Dr. L. A. Line, Dr. F. S. Booth, Dr. L. Featherstone, Dr. C. A. Verco, Dr. W. G. Shellshear, Dr. W. B. A. Moore, Dr. D. H. Griffiths, Dr. R. L. E. Downer, and Lt.-Col. G. C. E. Simpson. Associate Serving Brothers: Major Sorab Kaikhosru, Engineer, and Dhanjibhai Hormasji Mehta.

International Association for Preventive Pædiatrics.

The first meeting of this association will be held at The Hague on Sept. 7th and 8th, 1931. The subjects for discussion are to be Return Cases of Scarlet Fever and the Mortality in the First Ten Days of Life. Information about the meeting can be obtained from the secretary, Prof. G. Scheltema, 14A, Poelstraat, Groningen, Holland.

Medical Society of Individual Psychology.

A dinner of the Society will be held at the Florence Restaurant, London, W.1, on July 9th, at 7.15 for 7.30 P.M. (morning dress), and will be followed by the General Meeting.

London Jewish Hospital Medical Society.

The annual general meeting of the Society took place on June 25th, the President, Dr. L. Mandel, being in the chair. The following officers were elected for the session 1931–32:—President: Mr. M. Sorsby. Vice-President: Dr. L. Turiansky. Treasurer: Dr. Hannah Billig. Hon. Clinical Secretary: Dr. H. Avery. Hon. General Secretary: Dr. L. Phillips. Committee: Dr. Leah Appell, Dr. Borst, Dr. D. Krestin, Mr. S. I. Levy, Dr. M. Marcus, Dr. Fanny Robinowiz, Dr. M. Tree, Dr. A. D. Woolf. A vote of thanks to the outgoing President was proposed by Dr. Phillips and seconded by Dr. Schwarzman.

John Mallet Purser Lecture.

The first lecture was delivered in the School of Physic, Trinity College, Dublin, on June 26th, by Sir Edward Sharpey-Schafer, F.R.S., on the New Physiology. The chair was taken by Sir Almroth Wright, F.R.S., who had been admitted on the previous day the first Honorary Fellow of Trinity College. The lectureship was founded last year by Miss Jane Purser in memory of her brother, the late John Mallet Purser, who was King's professor of the Institute of Medicine in the School of Physic from 1874 to 1901, and Regius Professor of Physic in the University of Dublin from 1917 to 1925. Sir Almroth Wright had been one of his pupils. As King's professor Purser was the first teacher in Ireland to give systematic instruction in physiology and pathology.

Springfield Nurses' Home.

Last week Princess Mary opened the new nurses' home at Springfield Mental Hospital, Upper Tooting. The hospital now accommodates 1400 patients, and the new home is designed to house 140 nurses. The Princess also opened the new premises of the Wandsworth and Tooting Children's Clinic at Lower Tooting.

St. Thomas's Hospital Out of Debt.

For the first time since the war St. Thomas's Hospital is free of debt owing to donations of £104,000 from Sir William Morris and £100,000 from Lady Houston. As a mark of appreciation the portraits of these two donors have been hung in the hospital.

General Lying-in Hospital.

The annual report shows that in 1930 this institution in York-road, Lambeth, received 1068 in-patients, an increase of 53, and that 1165 women were attended and delivered at home, an increase of 65. There was one maternal death, for which the post-mortem failed to show any cause.

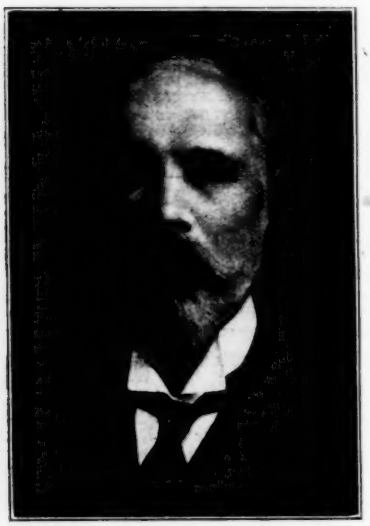
OBITUARY

DUDLEY WILMOT BUXTON, M.D., B.S. Lond., M.R.C.P. Lond.,

CONSULTING ANÆSTHETIST, UNIVERSITY COLLEGE HOSPITAL.

WE regret to announce the death of Dr. Dudley Buxton, the well-known authority on anæsthetics, which occurred on Sunday last, June 28th, in a nursing home on his seventy-sixth birthday.

Dudley Wilmot Buxton was born in 1855, the son of Mr. Harry Wilmot Buxton, a barrister-at-law of the Middle Temple. He received his general education at private schools, and University College, London, and his medical training at University College Hospital. He entered the hospital in 1878 and was a successful student, qualifying as M.R.C.S. three years later and taking the M.B. and B.S. London in 1882 with honours in each instance. He served as house physician and house surgeon at his hospital and proceeded to the M.D. degree in 1883 and took the M.R.C.P.Lond. in the following year. Before deciding on the career of a specialist he leant towards general medicine and was appointed by Sydney Ringer, then Professor of Medicine in the College, to be his assistant. Ringer stimulated him to study the scientific aspect of medicine, and helped him in his early work, undertaking with him an inquiry into the effects of acids, alkalies, and cocaine on the heart. At this time Buxton edited the fourth edition of Waring's Therapeutics, and was elected physician to the Marylebone General Dispensary.



DR. DUDLEY BUXTON.

But in 1885 he decided to specialise in anæsthetics, a subject which 45 years ago was in its youth as an exact science. He obtained the post of anæsthetist at University College Hospital, giving his services also to the Hospital for Women in Soho-square, to the Royal Dental Hospital, and in particular to the National Hospital, Queen-square. With his marked attainments and with these large opportunities for their exhibition, he soon became recognised as a leading exponent of his branch of medicine. As a lecturer he was an indefatigable instructor, triumphing over difficulties of elocution, and his pupils at University College Hospital and the Royal Dental Hospital were equipped in a way that was quite unusual in British medical schools to undertake the responsiblity of administering anæsthetics when they entered upon practice. His ability in teaching his subject was recognised by those who came back to learn from him many years after qualification—in fact, his recognition of the importance of every doctor going into practice with a competent knowledge of anæsthetics affected the teaching of this subject throughout all the country. He wrote largely and instructively in numerous journals, publishing researches into the action of various anæsthetics, and one work of his on the uses and administration of the different agents passed through six editions. On nitrous oxide, ether, and chloroform alike his observations were valuable. At first they were founded on the physiological deductions from experimental work, but later on an enormous and delicate experience, when he was often aided by the scientific discrimination of his great friend Sir Victor Horsley. It is due to Buxton's work on nitrous oxide that continuous nitrous oxide gas is now administered. With regard to ether he felt that the gas-ether induction was a kinder method than the open ether induction, while his study of colonic ether interested him greatly from the outset; he held that there should be further investigation of this method, and consequently the recent introduction of avertin as an anæsthetic was of great interest to him.

Buxton, both from his range of knowledge and his practical opportunities, was an acceptable figure on any committee of inquiry into anæsthetics. He served as secretary of a Special Chloroform Committee appointed by the British Medical Association, was a member of the Departmental Inquiry into the giving of anæsthetics, and made a valuable contribution to our knowledge of chloroform in his addendum to the Hyderabad Commission on Chloroform. At this time Buxton was the advisor of THE LANCET upon the subject of anæsthetics, and his labours in connexion with the Hyderabad Commission, undertaken for us, were of a difficult character. In 1888 the Nizam of Hyderabad, at the instance of his residency surgeon, Surg.-Major E. Lawrie, instituted an inquiry into the action and effects of chloroform, Lawrie desiring to prove that the risks attached to its use were preventing the anæsthetic from being sufficiently or properly used. The report of the Nizam's committee of inquiry was forwarded to THE LANCET, when various comments upon the conclusions were made. As a result, THE LANCET was invited to send a representative to hold a further inquiry on the spot. Lauder Brunton was selected for the task and a second inquiry of an elaborate sort was undertaken under his direction, the expenses being defrayed by the Nizam. The results of that inquiry were published as a supplement to THE LANCET in 1893 under the editorship of Dr. Dudley Buxton, who summarised, with extreme care and ability, the voluminous records, and furnished a clinical addendum. During later years he wrote monographs for the *British Journal of Anæsthesia* on Clover, Snow, Lister, and others who had influenced the development of anæsthesia. Such articles as Anæsthesia: its Physical and Psychological Aspects, and Sleep and Her Twin Sister Death, are typical examples of his broad views. His well-known work "Anæsthetics," reached its sixth edition in 1920, by which time its size had been more than doubled in accord with the developments of exact knowledge. His position as one who had contributed notably to these developments is shown by the posts which he filled, for he was at one time President of the Society of Anæsthetists, at another, of the Section of Anæsthetics of the British Medical Association, while he was selected to be President of the Section of Anæsthetics at the International Medical Congress, held in London in 1913.

During the war Dudley Buxton was anæsthetist to King George V. Hospital, in addition to his other appointments, and shortly after the termination of the world struggle he retired from London, having felt the stress of his long and arduous professional life. For 40 years he had had a cottage in Hertfordshire, and later he built a house near Boxmoor to which he retired in 1919. He was made consulting anæsthetist to the three great institutions with which he had been connected, University College Hospital, the Royal Dental Hospital, and the National Hospital, Queen-square, while residence so near London enabled him to keep green his many friendships. He soon found the interest of the countryside and of gardening insufficient for him, and took his recreation in administering anæsthetics and teaching the nurses at the West Herts Hospital until impaired health prevented these activities. He thus may be said to have died in office. To the regrets of his personal friends will be added those of the very many professional colleagues who recognised in Buxton a pioneer as well as an enthusiastic worker in his important field of medicine.

In 1884 he married Louise, daughter of the Rev. Thomas Grey Clarke, by whom he had three sons; the eldest, Leonard, formerly a Beit scholar, is now lecturer in physical anthropology at the University of Oxford; the second son, St. John, is surgeon to King's College Hospital; and the third Leycester, is dental surgeon to University College Hospital

WILLIAM DARLING, M.B., F.R.C.S.Edin.

Dr. William Darling, who died on June 23rd at the age of 60, was a well-known Edinburgh practitioner, who came of a family of school teachers and was himself a trained and acting teacher before entering medicine. He graduated M.B., Ch.B., at Edinburgh in 1899, he held hospital appointments in Leith, Manchester, and London, and studied for a year at Marburg, obtaining later special qualifications in surgery and public health. His educational training brought him into contact with training college work and when courses in personal hygiene were first established at these colleges Dr. Darling was selected as lecturer. For 20 years or so students and school children passed under his medical scrutiny. He always took a keen interest in the work of the R.A.M.C., and had served in South Africa. On the outbreak of war in 1914 he was called up as a member of the special reserve and took part in the retreat from Le Cateau and Mons. He was in the first battle of the Marne, and later on the Aisne; he was twice mentioned in dispatches and was awarded the Military Cross for services on the Somme. He was finally gazetted out as Lieutenant-Colonel in the R.A.F. Medical Service, to conduct a large general practice until within a few weeks of his death. A colleague writes: "Dr. Darling had a multitude of friends both among the general public and the profession. As an inspiring officer he will be very badly missed; for he had given a lifetime to the training of young officers and to promoting the work in the special reserve. He many times assured me that he would not for the world be without the experience of the Mons retreat."

THE LATE BARON KITASATO.

LAST week we published a biographical notice of Prof. Shibasaburo Kitasato with an appreciation by his friend and pupil Prof. Mikinosuke Miyajima. We are indebted to Prof. W. Bulloch for some further details of the six years spent in Robert Koch's Institute. It was in 1885, Prof. Bulloch writes, that Kitasato was sent to Europe by the Japanese Government to study bacteriology and infectious diseases, and he settled in Berlin at the Hygienisches Institut under Robert Koch, who was then nearing the height of his fame. Koch had recently (1882) discovered the causes of tuberculosis and (1883) of cholera, and his Institute was a mecca to which students were flocking from all parts of the world. Kitasato stayed in Koch's Institute for six years (1885–1891), and was given the honorary title of Professor of the University of Berlin. He worked in a small room, and was always busy. He soon mastered the rigorous bacteriological technique imposed by Koch on his pupils, and about 1887 began to publish researches on cholera and typhoid bacilli and on anthrax. He discovered several new organisms, one with a remarkable musk odour, *Fusisporium moschatum*. In 1889 he cultivated in a pure state *Bacillus tetani*. He showed that it was an obligate anaerobe, and by the accurate study of its distribution in the body was led to infer—and he was the first to do so—that lockjaw is essentially an intoxication disease. The actual toxin of tetanus was discovered by Knud Faber, 1890. In that year Behring and Kitasato discovered tetanus antitoxin and laid the first foundations of serum therapy. The brief but classical research of Behring and Kitasato was published in the *Deutsche Medizinische Wochenschrift* of 4th December, 1890, and contained the main facts regarding tetanus antitoxin—its properties, its durability, its passive transference, and its specificity.

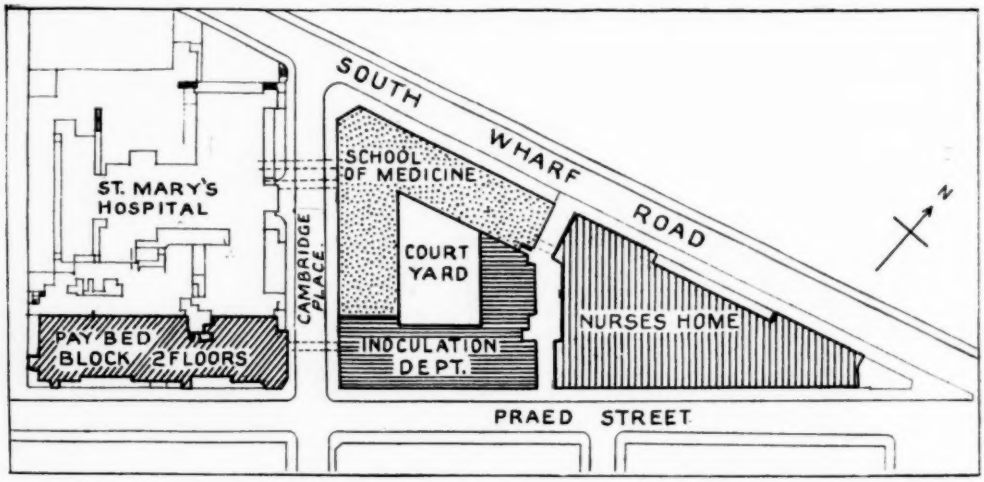
After his return to Japan in 1891, Kitasato founded the private bacteriological institute at Shirokane, across the bay from Tokyo city, which was first subsidised by and then taken over as a Government department under the name Imperial Japanese Institute for Infectious Diseases. Here, writes Prof. Bulloch, he created quite a Japanese School of Bacteriologists, amongst whom may be specially mentioned Kioshyi Shiga and S. Hata. In 1894, Kitasato was sent by his Government to Hong-Kong to investigate the nature of plague, which was occurring in epidemic form. This expedition resulted in his greatest discovery, *Bacillus pestis*. His work was done in record time. With Aoyama, the morbid anatomist, Kitasato landed at Hong-Kong on June 12th, 1894, and began his study on June 14th. In an autopsy he found numerous bacilli in the buboes and in the heart blood. He inoculated mice from the splenic blood, and on the same day also obtained blood from a living case of plague. Cultures were made, and all grew. They were inoculated into mice, guinea-pigs, rabbits, and pigeons. All died except the pigeons. He found the bacilli in fifteen cases of plague, and got out all the main facts of the bacteriology of bubonic plague. His first publication in English on plague appeared in the columns of THE LANCET (1894, ii., 428–430), and was a very complete piece of work.

A WAR MEMORIAL HOSPITAL.—Lady Violet Astor recently opened the Edenbridge and District War Memorial Hospital which takes the place of a house temporarily adapted in memory of men from the district who fell in the war. The building and equipment have cost £18,000. At the opening ceremony Mr. W. E. Tanner, the hon. consulting surgeon, said that the hospital was not surpassed in any part of the world, and that it was proposed to treat any kind of illness with the exception of infectious disease.

ST. MARY'S HOSPITAL, PADDINGTON.

FOUNDATION-STONE CEREMONY.

THE foundation-stones of the medical school and pathological institute of this hospital were laid on June 30th by H.R.H. the Duchess of York. The new buildings will occupy the island site between Praed-street, Cambridge-place, and South Wharf-road. The medical school will be in the north-west corner with administrative offices, common room, speech hall, and library on the ground floor; garage, cloak-room, billiard-room, swimming bath, and dining-room in the basement; and laboratories and classrooms above. The pathological institute will include laboratories, workrooms, animal rooms, and out-patients' department, and will be connected with the hospital by a bridge over Cambridge-place. The eastern angle of the site is reserved for a nurses' home.



Plan of the new building.

Lieut.-Colonel H. E. Verey (chairman of the hospital) welcomed the Duchess of York, and said that this was a great day for the hospital. The new premises would allow the provision of 30 more maternity beds in the old inoculation department, and he hoped it would not be long before the new nurses' home could be erected, making room for more maternity beds and for pay-beds. When the scheme was completed, the buildings would not fear comparison with those of any hospital in London. Nevertheless, it was not buildings that made a city but the spirit of the men that dwelt in it. The hospital had had a distinguished line of royal Presidents but had never been happier than in its present President, the Duchess of York.

Mr. Stanley Baldwin pointed out that less than a quarter of a century ago medical schools had been dependent on students' fees for their very existence. Now there were grants, but all capital expenditure, for buildings and research, still came from the public. This important fact was often forgotten by those who gave generously to hospitals. With the medical schools rested the training of future medical men, but nothing was done to help them to discharge that great obligation. As an example, he took the subject of maternal mortality, and the need for obstetric beds, training, and research. Extra maternity facilities should essentially be provided in hospitals with medical schools. The money available for the buildings being erected at St. Mary's had been principally the gift of a few individuals endowed with vision: Lord Revelstoke, Lord Iveagh, Lord Beaverbrook, and others, who were seeking the right way in which the heart and the head could combine in making a return for the generosity shown to them by life. The need must be brought to the notice of the general public. There was no field more fertile for human health and human happiness. Mr. Baldwin spoke warmly of the work of Sir Almroth Wright—a man in the true tradition of Jenner—and said that our country, which contained more latent talent than any other country in the world, might contain many potential Almroth Wrights. To find and endow this hidden talent was the great need, and this called for the endowment of scholarships. He prayed that the very rich might learn the superlative joy of giving, and that a due proportion of the exceptional men in the country, whatever their rank, might be led to join the great healing profession.

Dr. C. M. Wilson proposed, and Sir Almroth Wright seconded, a vote of thanks to Her Royal Highness. Dr. Wilson urged students to acquire a reverence for facts and a passion for exactitude, saying that these were the essential elements of Lord Revelstoke's mind. Research students must look on old problems from new angles, and see the world with the eager eyes of a child. Conventional thought, useful enough in its way, was a grave handicap in research. Medical education was the key to the health of the nation.

Sir Almroth Wright said that they were all out for this business of doing good; the question of reward fell right out of consideration. There was no reward for seeing or hearing or doing good. If the eye did not get pleasure from seeing or the limbs from moving, no amount of thanks would help them. Doing good was part of the vital energy of man that needed outlet. He especially mentioned his colleagues in the laboratories, Sir Max Bonn, Lord Iveagh, and Sir Edwin Cooper, the architect, who had designed an attractive home for their work.

The Duchess of York then laid the two foundation-

stones with a mallet used by Queen Victoria, King Edward VII., and King George V. The Bishop of Kensington offered prayers of dedication.

The funds for the commencement of the new buildings have been derived from gifts of £63,000, £25,000, and £40,000 from Lord Beaverbrook, the estate of the late Lord Revelstoke, and the Earl of Iveagh respectively. The committee of the inoculation department has contributed £20,000, and other gifts total £10,000. To complete the programme a further sum of £350,000 is needed, and for this a public appeal is being made.

A STATISTICAL SURVEY OF SIERRA LEONE.

THE difficulties attending the composition of vital statistics in most of our tropical dependencies are almost insuperable. The desirability of such reliable statistics is acknowledged on all hands, and were it possible to obtain records in any way comparable with those compiled in the older civilised countries, it would aid the cause of development and ease the burden of administration. That more strenuous efforts should be made to supervise the public health figures in our African colonies has recently been urged by public health authorities, notably by Major Granville Edge.[1] But the obstacles are great; except in the larger centres of administration, neither the medical organisation nor the personnel is in existence, and furthermore native superstitions and customs discourage too intimate inquiry into their home affairs. Post-mortem examinations cannot be performed as a routine in native bush villages, even where prejudice does not forbid the practice altogether. Prof. D. B. Blacklock has tried to overcome some of these difficulties by a sampling survey of a selected population in Sierra Leone.[2] From November, 1927, the survey was continued, with interruptions, till October, 1929. A period of four and a half months was allocated to the Northern and a year to the Central and Southern Provinces.

The Northern Province.

In the Northern Province four journeys were undertaken, being the principal villages visited. The total number of persons examined was 4337—the majority being subjected to a complete, the remainder to a partial examination. In his report of the results obtained the diseases are arranged in alphabetical order. Some of them are of special interest in view of popular impressions on native immunity from certain diseases. Numerous cases of arthritis were encountered, 143 showing deformity and swelling of joints. Blood examination of 636 persons showed the percentage infected with malaria parasites to be very high—57 per cent. Films of blood taken at night revealed *Microfilaria bancrofti* in 15 per cent., and the day blood of 257 persons revealed *Microfilaria loa* in less than 1 per cent. *Microfilaria perstans* was demonstrated twice.

THE PREVALENCE OF SKIN DISEASES.

Skin diseases were widespread. Apart from the cutaneous lesions of leprosy and yaws, scabies, impetigo, and pyosis were common. Pellagra-like eruptions were present on the hands and feet. In view of recent findings in Central Africa it is satisfactory that no cases of lung disease due to the tubercle bacillus were noted. Several patients, however, showed suspicious emaciation and physical signs. Human trypanosomiases contributed very little to the catalogue of the diseases found in areas visited during this survey. No cases actually suffering from small-pox were encountered, though 261 who gave a history of previous small-pox had not been vaccinated, great dread being evinced of this trivial operation. Gangosa, or the repulsive mutilating rhinopharyngitis, appears to be common; no less than 64 cases were seen. It was noted too in four subjects under 10 years of age. Evidence was forthcoming that gangosa is an expression of a generalised disease. No less than 87 per cent. of those afflicted with gangosa gave a history of yaws, and thickenings of the large bones were frequently observed. Gonorrhœa appears to be alarmingly prevalent, the youngest sufferer from urethritis being a child in arms. Of a total of 732 males over 14 years of age, evidence of existing gonorrhœa was found in 304. Perineal fistula and scrotal sinuses were definitely associated with an active infection. No less than 408 persons were found affected with hernia or hydrocele, umbilical hernia being more than twice as common as all the other forms of hernia combined. It is much more frequent up to 10 years of age. The section on tumours is disappointing. Lipomata are said to be relatively common in natives of this part of the Protectorate, but though the presence of other tumours including one definite case of scirrhous carcinoma of the breast is noted, no indication is given of the incidence of simple or malignant tumours in the population surveyed. Yaws was very prevalent; the number of cases from the Bullom region far exceeded the number of cases of this disease seen in other areas visited. No person of over 50 years of age was found affected, but the proportion of young people under 10 years of age with yaws was overwhelming. In 26 per cent. the primary lesion occurred on the upper extremity; in 54 per cent. on the lower extremity; and in 7 per cent. on the head and neck. The people themselves welcome the treatment of yaws by injections, and according to Prof. Blacklock there is some evidence that its permanent cure of yaws can be brought about by a few injections of bismuth or arsenic.

The Southern Province.

The second part of his report concerns itself with the Central and Southern Provinces. The same routine was observed over one year, and the number of persons examined was greater, being 5153, of whom 3678 were males and 1475 females. The blood of 151 persons was examined for microfilaria and trypanosomes. In five, *Microfilaria bancrofti* were found, and in one specimen of blood, trypanosomes were present. Satisfactory evidence of the existence of typhoid and paratyphoid infections was obtained. Out of a total of 556 persons whose serum was examined, the number of positive reactions ws 61—namely, 28 with *B. typhosus*, 3 with *B. paratyphosus* A, and 30 with *B. paratyphosus* B. There appears to be little doubt that the typhoid group occurs sporadically in Sierra Leone, and that the illness which affected a number of girls in the Moyamba American Mission School in 1926 was of this nature. Elephantiasis appears to be as commonly distributed as in the Northern Provinces, 42 cases being noted. Disfiguring gangosa was not so widespread as in the Northern Provinces, but gonorrhœa appears to be

[1] See THE LANCET, March 14th, p. 599.

[2] Report on a Survey of Human Diseases in the Protectorate of Sierra Leone. By D. B. Blacklock, M.D., Professor of Tropical Diseases of Africa, University of Liverpool; Director of the Sir Alfred Lewis Jones Laboratory, Freetown. Freetown: Government Printer.

even more prevalent than in the north, the incidence amongst the population being about 14 per cent. It is suggested that schools could do a great deal of valuable work in ascertaining more details about the distribution of physopsis. Schools should be provided with samples of snails and a record could be kept by the headmaster of such streams and swamps in which these snails were found by the children. Gonorrhœa is so prevalent and primary syphilis so rare in this community that it is concluded that some factor is at work which either does not permit *S. pallidum* to cause infection or prevents syphilitic sores of the genitals from assuming a characteristic form. Lesions affecting the soles of the feet were found, due to the aftermath of a previous yaws epidemic, while no less than 297 cases of fluid eruption of secondary yaws were seen.

General Observations.

This important work ends with a survey of general questions. An opportunity arose of making a re-survey of the village of Kaiyima, where extensive sanitary reforms had been undertaken as the outcome of a previous report in 1923–1924. It is satisfactory to note that the sanitary improvement carried out at Kaiyima, combined with the activities of the medical officer, have caused a diminution in the goitre percentage from 41 to 23 in males, and from 72 to 52 in females. A diminution in the schistosomiasis evidence could also be recorded, giving a positive percentage of 42 as compared with a percentage of 65 in 1923. A well-deserved tribute is paid to the Paramount Chief who, alone of all the Chiefs, has fulfilled his promise of trying to make his town healthy. In the survey of the Central and Southern Provinces, it was observed that far more persons of advanced age were seen at examination, and that large numbers of persons with congenital and other abnormalities appeared to survive. In every village there were found people who understood English and were familiar with several European drugs. Their superior economic status and their better and more varied dietary presumably increases their resistance to disease, for generally speaking the disease incidence was less than in the Northern Province. In conclusion it is strongly advocated that aspirants to the posts of Paramount Chief, Chief, and Sub Chief, should be required to show some knowledge of, or evince some interest in, the measures by which the health of their people could be improved.

PUBLIC HEALTH SERVICES

MENTAL HOSPITAL REPORTS.

THE LEICESTER CITY MENTAL HOSPITAL at WEST HUMBERSTONE had 976 patients in residence on March 31st last, and the accommodation for recent and acute cases has now become inadequate. A new nurses' home is being built and the committee are considering the provision of a reception hospital. The recovery-rate for the year was 39·26 per cent. and the death-rate 7·15 per cent. This is a slight decline in the former and increase in the latter, both accounted for by the admission of chronic and unsatisfactory cases from the North Evington Infirmary. The cause of death was verified in 86 per cent. of cases by post-mortem examination. There was a mild outbreak of dysentery among the women in October, but no deaths resulted, and otherwise the general health was good. Parole is allowed to 60 per cent. of the men and 38 per cent. of the women, and during the year leave of absence was granted to men on 3576 occasions and to women on 1474 occasions, while 77 per cent. of the patients were usefully employed. General paralysis is treated by malaria; during the year 15 patients were inoculated, of whom five died and four have been discharged. Since the treatment was first introduced in 1924, 81 patients have been treated, with a discharge-rate of 24·7 per cent. and an improvement-rate of 18·5 per cent. In addition to the work with malaria and with the dysentery outbreak, the pathological laboratory carried out a large number of routine observations and investigated the Vernes test. The visiting dentist performed 351 operations, and inspected 40 patients, whose teeth were in good condition. The arrears of dental disease before a dental clinic was held have now been overtaken and no patient's health or happiness is burdened any longer by a septic mouth. Of the 114 male and female nurses, 24 men and 25 women are certificated or registered; five members of the staff obtained their certificate during 1930. An out-patient clinic is held weekly, and the committee are considering the appointment of an after-care officer.

The LEICESTERSHIRE AND RUTLAND MENTAL HOSPITAL at NARBOROUGH had 747 patients on its register at the end of last year. The recovery-rate was 34·6 per cent. and the majority of those recovered were first sent out on trial. The death-rate was 8·2 per cent. and the cause of death was verified by examination in 86·4 per cent. of cases. The general health was good during the year and there was no epidemic disease. The institution, like so many others, is overcrowded, and the committee is taking steps to provide accommodation for quiet senile cases in a "poor-law" institution. Unfortunately, mental defectives are still housed in this mental hospital, and the proposed colony will not be available for them for some time. Great improvement has been brought about by the provision of a bread-slicing machine and a butter-pat-making machine; instead of the thick slabs of bread spread with margarine hours before it was eaten, each patient now receives two slices of nicely cut bread and two pats of margarine (10 per cent. butter), kept in the cold room until a few minutes before the meal. Not only do the patients greatly appreciate this, but at least two hours of a nurse's time is saved in each ward, and the new system ensures that every patient gets a correct ration of fat. The uniform of the staff has been changed to a modern type, which greatly pleases the wearers and helps to increase the "nursing" atmosphere. The laboratory started to function at the close of the year, and clinical rooms have been provided. Cases of general paralysis—of which only three were under treatment this year—have been treated by sulpharsenol, but malaria inoculation will be used in future. A dental surgeon has been appointed, and members of the staff of the Leicester Royal Infirmary act as consultants when required. A cinematograph machine was provided during the summer, to the great delight of the patients. The use of parole has been extended.

The CUMBERLAND AND WESTMORLAND MENTAL HOSPITAL had 854 patients resident on Dec. 31st last. The recovery-rate was 43 per cent.—58 per cent. for the males—and the medical superintendent attributes this gratifying figure largely to judicious granting of parole and trial visits. The death-rate has dropped from 8·4 to 6·2 per cent. and the phthisis rate has also fallen. There was one case of paratyphoid fever, but otherwise the health of the community was good. The medical superintendent pleads for the provision of an admission block arranged on modern lines and for the appointment of a social worker. He is also anxious to introduce an occupation centre. A laboratory is being established. The staff are prepared for the R.M.P.A. examinations.

There were 1082 patients in the COUNTY AND CITY OF WORCESTER MENTAL HOSPITAL at POWICK at the end of last year. A day room and a dormitory have been redecorated and set apart for recent admissions, and a verandah is to be added to this department. The recovery-rate for the year was 34 per cent. and the death-rate 6·2 per cent. Autopsies were held in 75·8 per cent. of cases. The general health was good, except for one case of typhoid and one case of paratyphoid fever. The dentist visits once a fortnight. Electric light is to be installed shortly and it is hoped that a cinema, X ray and ultra-violet ray plant will soon follow. During the year five male and five female nurses obtained their R.M.P.A. certificates.

The GLAMORGAN COUNTY MENTAL HOSPITAL at BRIDGEND was overcrowded at the end of last year by no less than 295 patients, the total in residence being 2108 on Dec. 31st. The recovery-rate for the year was 29·7 per cent. and the death-rate 6·6 per cent. Post-mortem examinations were performed on 52·5 per cent. of cases. The general health was remarkably good considering the overcrowding, and the only epidemic disease, apart from influenza, was chicken-pox (four cases) and erysipelas (one case). The dental surgeon visited fortnightly and attended 258 patients. The visiting surgeon performed three operations, and 60 diagnostic X ray photographs were taken. Over 60 patients were allowed out on trial before discharge, but only seven of them received money allowances. The visiting commissioners deplore the absence of a laboratory, continuous bath, malarial treatment for general paralysis, and adequate verandah accommodation. Parole is allowed to 20 men beyond the estate and to 125 within it. Seven women nurses are employed on the male side and 112 men and 44 women are certificated or registered. Fifteen attendants and eight nurses obtained their R.M.P.A. certificate last year.

MENTAL DEFICIENCY.

The ROYAL EASTERN COUNTIES' INSTITUTION FOR THE MENTALLY DEFECTIVE at COLCHESTER has now over 1400 patients on its books. Many improvements were carried out during last year, at a cost of nearly £7000. A new single-storey hospital has been built, with 31 beds. This left accommodation on one side of the old hospital for the senior male patients, who needed a quiet place where they could do as they liked; the oldest "boy" is 84 and the next is 77. The furniture for both these new departments was made by inmates, who also built two staff cottages, doing all the work except the internal plastering. Central heating has been installed at Bridge Home, where it was a necessity for the low-grade boys with poor circulations. A wireless installation has been bought and so also has an electric gramophone, which will broadcast to all stations in the institution. A great many other minor improvements have been made, the greater part of the work being done by the boys and girls themselves. During the year 58 patients were sent out on licence, bringing the total on licence to 115. Thirty (20 per cent.) returned during the year; 12 of these, however, only returned for holidays or illness and went out again. Only two definitely came back for bad behaviour. There were only 17 deaths during the year, which is very satisfactory when it is remembered that many of the children are physically disabled and of so low grade that they seldom seem to know when they are ill, and only the most careful observation on the part of the staff detects the first beginnings of ill-health. The guides and brownies have now taken 420 second-class and proficiency badges and the scout troop and cubs have had a successful year, having won over a hundred second-class and proficiency badges. There has been a steady decline in the number of deaths from tuberculosis; this seems to date from 1905, when the ventilation of the institution was remodelled. There has now been no case of diphtheria since 1925 when the Schick test was instituted as a routine. Dr. F. Douglas Turner discusses the causation of mental defects and derives hope from the general tendency at the present time to ascribe at least half the cases to disease, toxæmia, or injury. He welcomes the appointment of a research medical officer and a social investigator who are to make the fullest possible investigation into each patient and carry out such lines of research as occur to them. Discussing the duties of local authorities under the Local Government Act, he stresses the importance of providing one all-embracing colony for every type of defective; the different types will live in different classes according to age, conduct, and mental capacity, but the colony must include all those for whom the local authority is responsible, except the dangerous cases.

Medical Diary

SOCIETIES.

OXFORD OPHTHALMOLOGICAL CONGRESS.
THURSDAY, July 9th.—10 A.M., in the Department of Human Anatomy, Opening Address by Mr. A. B. Cridland. Symposium on the Diagnosis of Intracranial New Growths, by Mr. Leslie Paton, Sir Percy Sargent, Dr. H. M. Traquair, Mr. Norman Dott, and Prof A. Schüller.
FRIDAY.—11 A.M., Doyne Memorial Lecture by Mr. P. H. Adams.

ROYAL MEDICO-PSYCHOLOGICAL ASSOCIATION: Annual Meeting at the Royal College of Physicians, Dublin.
WEDNESDAY, July 8th.—2 P.M., Presidential address by Mr. R. R. Leeper on the Progress of Psychiatry.
THURSDAY and FRIDAY.—10 A.M., Papers and discussions.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE, MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, July 6th, to SATURDAY, July 11th.—ST. PETER'S HOSPITAL, Henrietta-street, W.C. Wed., at 5 P.M. Demonstration of cases in the Out-patient Department and Urethroscopies by Mr. A. H. Harkness. Open to men only, free.—HOSPITAL FOR DISEASES OF THE SKIN, 71, Blackfriars-road, S.E. Fri., at 6 P.M., Demonstration of Cases by Dr. W. B. Winton. No fee.—ROYAL WATERLOO HOSPITAL, Waterloo-road, S.E. Wed., 4.30 P.M., lecture by Dr. G. M. Slot on Recent Advances in Treatment of Gastro-Intestinal Disease.—ST. JOHN'S HOSPITAL, Lewisham. A special course in Diseases of Children by Dr. John Gibbens. Every afternoon, and Sat. morning.—PRINCE OF WALES'S HOSPITAL, Tottenham, N.15. Intensive course in medicine, surgery, and the specialties, for two weeks, 10.30 A.M. to 5.30 P.M. (first of two weeks).

WEST LONDON HOSPITAL POST-GRADUATE COLLEGE, Hammersmith, W.
MONDAY, July 6th.—10 A.M., Gynæcological Ward Visit. Genito-Urinary Operations, Skin Department. 11 A.M., Surgical Ward Visit. 2 P.M., Surgical Ward Visit. Medical, Surgical, Eye, Gynæcological Out-patients.
TUESDAY.—9.30 A.M., Operations. 10 A.M., Medical Ward Visit, Dental Department. 11 A.M., Throat Operations 11.30 A.M., Surgical Clinical Demonstrations. 2 P.M., Medical, Surgical, Throat Out-patients, Operations, Medical Ward Visit.
WEDNESDAY.—10 A.M., Medical Ward Visit, Children's Medical Out-patients. 2 P.M., Medical, Surgical, and Eye Out-patients, Gynæcological Operations. 4.45 P.M., Venereal Diseases.
THURSDAY.—10 A.M., Neurological Department. 11.30 A.M., Treatment of Fractures. 2 P.M., Medical, Surgical, and Eye Out-patients. Genito-Urinary Department Operations.
FRIDAY.—10 A.M., Medical Ward Visit, Skin and Dental Departments. 12 noon, Medical Lecture. 2 P.M., Medical, Surgical, and Throat Out-patients. Operations.
SATURDAY.—9 A.M., Throat Operations. 10 A.M., Medical Ward Visit, Surgical and Children's Medical Out-patients.

CHARING CROSS HOSPITAL MEDICAL SCHOOL POST-GRADUATE COURSE.
SUNDAY, July 5th.—10.45 A.M., Mr. L. R. Broster: Surgical Emergencies. 11.45 A.M., Dr. J. E. M. Wigley: Demonstration of Cases of Skin Disease.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
TUESDAY, July 7th.—3.15 P.M. (at the Royal Chest Hospital), Dr. J. Maxwell: Intrathoracic Lipiodol.

ST. MARK'S HOSPITAL, City-road, E.C.
THURSDAY, July 9th.—4.30 P.M., Mr. Lockhart-Mummery: Perineal Excision of the Rectum, with cinematograph demonstration.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, July 7th.—3.30 P.M. (at the General Hospital), Mr. Musgrave Woodman: Infection of the Ear in General Practice.
FRIDAY (at the Queen's Hospital).—3.30 P.M., Mr. J. N. Sankey: The Diagnosis and Treatment of Infections of the Hand.

Appointments

REGAN, D., M.B., Ch.B., N.U.I., has been appointed Asst. Medical Officer and Asst. Schools Medical Officer, Ilford.

RYMER, N. A., M.B., Ch.B., Leeds. Certifying Surgeon under the Factory and Workshops Acts for Hull.

Vacancies

For further information refer to the advertisement columns.

Accrington, Victoria Hospital.—H.S. £150.
All Saints' Hospital for Genito-Urinary Diseases, 91, Finchley-road, N.W.—H.S. At rate of £150.
Association of Surgeons, Wimpole-street, W.—Surgical Scholarship. £350.
Barnsley, Beckett Hospital and Dispensary.—Cas. O. and H.P. £250 and £200 respectively.
Bath, Royal Mineral Water Hospital.—Hon. Electrologist.
Bath and Wessex Children's Orthopædic Hospital, Coombe Park.—H.S. At rate of £120.
Birkenhead General Hospital.—Hon. Surgeon to Ear, Nose, and Throat Dept.
Birmingham, Midland Hospital, Easy-row.—H.S. £150.
Birmingham, Selly Oak Hospital.—Casualty O. At rate of £200.
Bolton Infirmary and Dispensary.—Two H.S.'s. Each £150.
Brighton Borough Infectious Disease Hospital, &c.—Res. M.O. £400.
Bristol Eye Hospital.—Asst. Res. H.S. £100.
Bristol Royal Infirmary.—Sen. Res. M.O. £200. Also Res. Dental H.S. and Res. Cas. H.S. Each £80. Also Res. H.P.'s and H.S.'s. All at rate of £60. Also Hon. Asst. to Obstetric Dept.
Bury Infirmary, Lancashire.—Third H.S. At rate of £150.
Cambridge, Addenbrooke's Hospital.—Res. Anæsthetist and Emergency O. At rate of £130.
Cardiff Royal Infirmary.—H.P.'s and H.S.'s to Special Depts. All at rate of £50.
Carnarvon, County of.—Asst. School M.O. £600.
Central London Ophthalmic Hospital, Judd-street.—Out-patient Officer. £200.
Dudley Guest Hospital.—Two H.S.'s. Each £160–£170.
Durham County Hospital.—Two H.S.'s. Each £150.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Surgeon for Nose, Throat, and Ear Dept.
Enfield Education Committee.—School Dental Surgeon. £500.
Evelina Hospital for Children, Southwark, S.E.—Cas. and Out-patient Officer. At rate of £120.
Exeter, Royal Devon and Exeter Hospital.—H.P. Also H.S. to Spec. Depts. Each at rate of £150.
Fulham Metropolitan Borough, S.W.—Part-time Asst. M.O. for Maternity and Child Welfare Dept. At rate of £300.
Great Yarmouth General Hospital.—H.S. £140.
Guildford, Royal Surrey County Hospital.—H.S. £150.
Hampstead General and North-West London Hospital, Haverstock-hill, N.W.—Cas. Surg. O. for Out-patient Dept. At rate of £100. Also H.P. At rate of £100.
Harrogate Infirmary.—Sen. and Jun. H.S.'s. At rate of £150 and £125 respectively. Also H.P. At rate of £150.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. At rate of £50.
Hove Hospital, Sackville-road.—Res. M.O. £200.
Hove, Lady Chichester Hospital.—Jun. H.P. At rate of £50.
***Hull Royal Infirmary.*—3rd H.S. At rate of £150.**
***Ipswich, East Suffolk and Ipswich Hospital.*—Cas. O. £120.**
Kidderminster and District General Hospital.—H.S. £150.
King's Lynn, West Norfolk and King's Lynn General Hospital.—H.P. At rate of £125.
Kingston-upon-Hull, City and County of.—M.O.H. £1500.
Lancaster Royal Infirmary.—Jun. H.S. £130.
Leicestershire County Council.—Asst. County M.O.H. £700.
Liverpool, Royal Babies' Hospital, &c.—Res. M.O. At rate of £600.
***London Hospital, E.*—First Asst. and Reg. to Children's Dept. £300.** Also Hon. Asst. Anæsthetist.
Manchester and District Radium Institute.—Asst. Radium Officer. £300–£500.
Manchester, City Education Committee.—Asst. School M.O. £600.
Manchester Royal Children's Hospital.—Sen. M.O. £300.
Manchester Royal Infirmary.—Asst. M.O. to Dermatologica Dept. £20.
Manchester, St. Mary's Hospitals.—Five H.S.'s. All at rate of £50.
Maudsley Hospital, Denmark Hill, S.E.—2nd. Asst. M.O. £625.
Middlesex County Council.—Ophthalmic Surgeon. £2 12*s.* 6*d.* per session.
***National Hospital, Queen-square, W.C.*—Registrar and Res. M.O. Each £200.**
Newport, Mon., Royal Gwent Hospital.—Jun. Res. M.O. £135.
North-Eastern (Fever) Hospital, St. Ann's-road, Tottenham, N.—Res. Med. Supt. £1100.
Plymouth, South Devon and East Cornwall Hospital.—H.S. At rate of £100.
Queen Mary's Hospital for the East End, E.—Hon. Asst. Physician.
***Queen's Hospital for Children, Hackney-road, E.*—H.S. At rate of £100.** Also Res. M.O. At rate of £200.
Radium Institute, Riding House-street, W.—H.S. At rate of £150.
Rotherham Hospital.—Cas. H.S. £150.
Royal Free Hospital, Eastman Dental Clinic, Gray's Inn-road, W.C.—Res. H.S. £100.
Royal London Ophthalmic Hospital, City-road, E.C.—Out-patient Officer. £100.
Royal Northern Hospital, Holloway, N.—H.P. At rate of £70.
***Sheffield Children's Hospital.*—Whole-time Registrar-Pathologist. £350.** Also 3rd Res. M.O. At rate of £80.
***Sheffield Royal Infirmary.*—H.S., Ophth. H.S., Asst. Aural and Ophth. H.S. Each at rate of £80.** Also Surg. Reg. £300.
Society of Apothecaries of London, Water-lane, Queen Victoria-street, E.C.—Examinership in Surgery.
Southport General Infirmary.—Jun. H.S. £125.
South Shields, Ingham Infirmary.—H.S. £150.
St. John's Hospital, Lewisham, S.E.—H.S. and Cas. O. Each at rate of £100.
St. Leonards-on-Sea, Buchanan Hospital.—Jun. H.S. At rate of £125.
St. Mark's Hospital for Cancer, Fistula, &c., City-road, E.C.—H.S. At rate of £75.
Sudan Medical Service.—Two M.O.'s. £E.720.
Swansea General and Eye Hospital.—H.P. £150.
Victoria Hospital for Children, Tite-street, Chelsea, S.W.—H.P. and H.S. Each at rate of £100.
Walsall, Manor Hospital.—Asst. M.O. £150.
Warrington Infirmary and Dispensary.—Jun. H.S. £175.
Warwick County Mental Hospital, Hatton.—Second Asst. M.O. £450.
Willesden General Hospital, N.W.—H.P. and H.S. At rate of £100 and £110 respectively.
Winchester, Royal Hampshire County Hospital.—H.P. At rate of £150.
Wolverhampton Royal Hospital.—H.S. and H.P. At rate of £125. H.S. At rate of £100. Also Hon. Fracture and Orthopædic Surgeon.

Births, Marriages, and Deaths

BIRTHS.

CUMMING.—On June 24th, at 56 Brunswick-square, Hove, the wife of Dr. John Cumming, of a daughter.
KERR.—On June 26th, at Bexhill, the wife of John Kerr, M.B., Ch.B., of a son.
LANGFORD.—On June 29th, at Cambridge-villa, Chiswick, W. 4, the wife of John C. C. Langford, M.R.C.S., of a son.
ROACHSMITH.—On June 21st, at Napsbury, the wife of Dr. C. E. Roachsmith, of a son.
ROBERTSON.—On June 25th, at The Green, Godstone, the wife of Douglas Robertson, M.R.C.P., of a son.

MARRIAGES.

HARDY—MANSFIELD.—On June 25th, at St. Michael's Church, Bournemouth, Edward William Dacre Hardy, M.C., M.R.C.S., L.R.C.P., to Dorothy Margaret, eldest daughter of Mr. and Mrs. Merton John Mansfield, of 7, Vernon-terrace, Brighton.

DEATHS.

BAILEY.—On Sunday, June 28th, suddenly, at Holly Bank, Headley, Hampshire, Henry Frederick Bailey, M.R.C.S., aged 86.
BUXTON.—On June 28th, his 76th birthday, at a nursing home, Dudley Wilmot Buxton, M.D., M.R.C.P., of Coldharbour, Boxmoor.
HAHR.—On June 28th, Carl Gustav Waldemar Hahr, M.R.C.S., L.R.C.P., of 50 Seymour-street, W. 1.

N.B.*—*A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages and Deaths.

LIVERPOOL HOSPITALS.—The Royal Southern Hospital, Liverpool, last year admitted 3666 in-patients, and dealt with 25,726 out-patients; the latter figure is a fall of 527, mainly accounted for by the increasing number attending the massage and actinotherapy departments. In the theatre, now inadequate, there were 3693 operations. The average stay of each in-patient was 21 days, and the average weekly cost was £3 1*s.* 9½*d.* Out-patients cost 6*s.* 3*d.* each. Although the cost of maintenance fell by £3485, the loss on the year's working was £9515. At the beginning of 1930 the debt to the bank amounted to £40,919, but it was reduced by £13,481 by the sale of securities representing the investment of free legacies in the early days of the institution.—The Lady Mayoress of Liverpool last week opened a new wing of the Liverpool Maternity Hospital which has cost £108,000, and was opened free from debt. It is proposed at a future date to add an isolation block and accommodation for medical students. There are now 85 beds and 75 cots, a lecture room, and other facilities for the teaching of nurses undergoing midwifery training, and a pathological laboratory. Last year there were 12,456 attendances at the hospital and 26,371 at the city's clinics.—A new nurses' home has been opened at the Robery Davies Nursing Home, West Derby, which was established six years ago for the reception of middle-class patients. The number of patients increased from 376 in 1928 and 461 in 1929 to 487 in 1930. The building of the nurses' home has made available 12 additional private wards.

NOTES, COMMENTS, AND ABSTRACTS

THE HEROIN HABIT.[1]

THE Council of the League of Nations last May appointed, for the purposes of a conference on the limitation of the manufacture of narcotic drugs and the traffic in opium, Prof. W. E. Dixon (University of Cambridge), Prof. Erich von Knaffl-Lænz (University of Vienna), Prof. M. Tiffeneau (Faculty of Medicine, Paris), and Dr. P. Wolff (Privat docent at the University of Berlin). The Technical Committee of the League thereupon asked the experts to report upon the following questions:—

1. What are the properties of diacetylmorphine (heroin) which make it particularly suitable to serve as a habit-forming narcotic drug, and to form the subject of illicit traffic?

2. What are the therapeutic advantages of diacetylmorphine as compared with those of morphia and other morphine derivatives?

3. Are the therapeutic properties of diacetylmorphine such that it cannot be replaced by other medicaments without ill-effects on the patient?

4. Are not the risks of diacetylmorphine for humanity incomparably greater than the advantages resulting from its therapeutic use?

5. Can the experts state what is the medical practice in each of the countries possessing a highly developed medical system, as regards the use of diacetylmorphine, and give their opinion as to the value of its use?

6. Is diacetylmorphine (heroin) an indispensable drug?

The experts reached a unanimous decision as to the above-mentioned questions, and their report is incorporated in the following document.

Report of the Expert Committee.

PREAMBLE.

As a preamble to the answer seriatim of the questions the experts found that morphine and its derivatives, whether habit-forming or not, possessed certain common characteristics and properties, but exhibited them in degrees so varying that it was necessary to refer to the variations before replying to the questions. The properties of the drug they find to be reduced to the following three principal actions:—

(*a*) *Analgesic and Euphoric Properties.* — These belong only to the habit-forming morphine alkaloids; they render these alkaloids *pain* relieving, and in certain people they alter psychical reflexes, so as to produce a feeling of *happiness and well-being.* The continual use of such alkaloids leads to addiction, and the addict acquires an irresistible craving and ever-increasing tolerance.

(*b*) *Depressing Properties on the Respiratory Centre.*— These are common to all the habit-forming morphine alkaloids, though different alkaloids show the effect in different degrees. This effect is manifested principally in the relief of cough and all painful affections of the respiratory system.

(*c*) *Depressing Properties on the Alimentary Canal.*— These are shown best with morphine, and render it valuable in the treatment of certain forms of colic.

The report continues: The *differences* between the various morphine alkaloids with regard to these properties are chiefly quantitative. These differences are *not necessarily in the same direction;* any one of these properties may be exaggerated, whilst another is at the same time hardly obvious. In *codeine* (methyl morphine), for example, the analgesic and euphoric properties (*a*) of morphine are very weak, whilst the (*b*) property is relatively little changed, and the (*c*) effect is a little weaker. In *heroin* the properties (*a*) and (*b*) are stronger, whilst the intestinal action (*c*) hardly exists.

The knowledge of these properties to the physician is of the utmost importance, not only in the treatment of drug addiction, but, what is much more important, the prevention of this condition. It is also an essential part of the doctors' armamentarium to be able to prescribe these drugs with the least risk, whilst providing for all the patient's requirements. Thus the choice of a drug like codeine for the relief of cough avoids the analgesic and euphoric action of morphine which in this case is useless or even harmful, as it involves unnecessary risks.

REPLIES TO THE QUESTIONAIRE.

1. Heroin is more powerful than morphine and its dose is smaller. Unlike morphine it may be readily taken as snuff. In the East it is occasionally smoked. Also in view of the smallness of its dose, trafficking is easier. Heroin euphoria is much more pronounced than that of morphine, and constipation does not occur in the addict—that is, the (*a*) and (*b*) effects are stronger and the (*c*) effect negligible.

2. Heroin has about double the action of morphine in the relief of pain (*a*). It is more effective than either morphine or codeine in the relief of cough (*b*). It does not constipate.

3. The properties of heroin, which render it popular with some physicians, can in most if not all cases be efficiently replaced by other morphine drugs. For the relief of cough codeine is a valuable substitute, though not so strong as heroin; dicodid has as powerful an effect on the respiratory centre as morphine, though less than that of heroin, and its addiction properties are less pronounced than those of the latter drugs. For the relief of pain in patients in whom it is undesirable to act on the bowels, heroin is better than morphine but dilaudide offers the same advantages. This alkaloid has much the same type of effect on the respiratory centre as heroin but is weaker; it has about the same influence as heroin in its pain-relieving properties, and, like heroin, has little effect on the alimentary canal. Furthermore, the euphoric effects of dilaudide are weaker than those of both morphine and heroin as gauged by withdrawal symptoms.[2]

4. We feel that the dangerous nature of heroin from the social point of view overshadows its therapeutic importance. The social dangers of heroin arise on the one hand from the great reputation this substance possesses among drug addicts and from the enormous illicit traffic which has arisen; on the other hand, they come from its characteristic habit-forming properties, which, from the medical point of view, are much worse than those of other habit-forming narcotic drugs. The effect of heroin is in the main to produce a change in personality as shown by an utter disregard for the conventions and the morals of civilisation. The disease progresses more rapidly than with any other habit-forming narcotic drug; all the higher faculties of mind, such as judgment, self-control, and attention, are weakened, and such people rapidly become mental and moral degenerates. The heroin habit is the most difficult of all to cure; sudden withdrawal of the alkaloid which, according to most authorities, is the best treatment for the morphine habit, may lead to cramps and convulsions and even to death from respiratory failure. But besides the difficulty of withdrawal, the after-convalescent treatment, both psychical and physical, is longer and more difficult with heroin, and relapse is the rule.

5. The opinion of the medical profession on the therapeutical value of heroin varies not only in

[1] League of Nations. Traffic in Opium and Dangerous Drugs; Expert Report of a Technical Committee on Heroin.

[2] With regard to the recently introduced dilaudide, Profs. Dixon and Tiffeneau desire to place on record that they have had no personal experience.

different countries but even in the same country. The medical consumption rates per head of the population for this substance, as shown by the League statistics, differ to such an extent that it suggests that its use is perhaps not unconnected with fashion. For example, there is a difference of 400 per cent. between the consumption rates for Great Britain and Germany, 4000 per cent. between those of Switzerland and France, and 4500 per cent. between Switzerland and Japan. Our attention has been drawn to the use made of heroin in the following sickness insurance societies (Krankenkassen) of two large cities in Central Europe. The Allgemeine Ortskrankenkasse der Stadt Berlin, with a membership of about 500,000, shows for 1927 a consumption of 0, and for 1928 a consumption of 3·24 g. If this figure were accepted as a basis of estimation, then for a group of 65,000,000 of inhabitants which represents the whole German population, the consumption should only total 425 g., whereas the actual consumption of this country was 36 kilos during the same year. The Krankenversicherunganstalt der Bundesangestellten of Vienna, which has also a membership of about 500,000, shows for the same period a total consumption of 144 g. Estimated on this basis, the total consumption of Austria would amount to 1930 g., whereas it was actually over 5 kilos. In considering these figures it should be borne in mind that these two groups of insured people belong to large urban centres whose narcotic consumption is usually higher than that of the rural populations, and that the members of these societies always represent that portion of the population which is best provided for as regards medical assistance. We have evidence that a large majority of the eminent pharmacologists and physicians throughout Europe and America are definitely opposed to the employment of heroin in medical practice.

6. In view of the evidence which we possess, and especially the fact that all the beneficial actions of heroin can in our opinion be obtained by one or other of the drugs mentioned, we believe that heroin can be entirely dispensed with. If the doctors in countries where heroin is used are afforded the opportunity of examining and testing clinically the morphine derivatives to which we have drawn attention, we feel little doubt that they may be induced to dispense with the use of heroin entirely.

A DEMONSTRATION OF THE SCHELLBERG APPARATUS.

A DEMONSTRATION was held at 55a, New Cavendish-street, London, on Thursday, June 25th, of this apparatus for colonic lavage, when a considerable assembly heard a description by Dr. Kerr Russell of the working of the apparatus while there was an informal debate on the medical claims for the treatment. From the mechanical point of view, the construction of the apparatus is ingenious and not difficult of manipulation, as was made clear by Dr. Russell's explanation. The object is to irrigate the cæcum and colon by the passage of a rubber tube by stages, and in the course of a varying number of sittings, along the complete length of the colon into the cæcum. The apparatus consists of three movable reservoirs for holding the different fluids used, a three-way tap for permitting the in-flow, and a tap for discharging the fluid siphoned from the colon into a container and thence to a soil pipe. Different thicknesses of rubber tubing are available. A central and large container holds two gallons of warmed distilled water. This is used for the first stage, to aid the catheter to be passed through the impacted masses right up to the cæcum. Arrived there, it is gradually withdrawn, and the contents of the two other smaller containers (of two quarts each) are gradually introduced during withdrawal. In this way the whole colon, from the cæcum to the anus, can be irrigated, it is claimed, with any substance prescribed. When the tube is completely withdrawn a natural evacuation of the bowel contents should follow, though this may not be obtained until after several sittings. The statement that the tube can be made to reach the cæcum has been supported by X ray photographs, when any medicament or disinfectant considered desirable can be injected, one of the commonest of these being a suspension of the anti-fermentative *Bacillus acidophilus*.

HINTS ON DIETS.

PRACTICAL guidance for the construction of diets suitable for use in the treatment of various diseases can be obtained from a handbook,[1] recently published, by Miss Simmonds, who is dietitian to the London Hospital. The principles underlying the selection of foods for use in special diseases and individual cases are briefly discussed, but most of the book is occupied by sample menus which have been found useful in clinical practice. The absence of controversial material is illustrated by the fact that no mention is made either in the text or in the index of diet in the treatment of nephritis, though sections are devoted to salt-poor and high protein diets. The feeding of the infant and young child forms a separate chapter. The practitioner should find this inexpensive volume of considerable assistance in his everyday work.

THE MECHANISM OF VISION.

THOSE who want to know something about the mechanism of vision and the common diseases of the eye without going deeply into the subject will find a little book by Dr. H. G. Merrill and Dr. L. W. Oaks [2] informative up to a point. The more difficult parts of the subject are not made very clear, partly because the diagrams are too scanty. Moreover, experts would object that the treatment of the whole subject is rather too dogmatic. It would hardly be possible adequately to treat such subjects as the relative functions of the rods and cones, the mechanism of accommodation, the circulation of the fluid within the eyeball, or the theory of colour vision in such an elementary book. The most that could truly be said would be that even among experts there is still considerable difference of opinion on most of these subjects. On the other hand, some useful information is given about squint in children with good advice on the necessity of early treatment, although the impression here given—that nearly all cases can be cured by appropriate glasses—is far too optimistic. The photographs demonstrating the types of ill-fitting spectacles commonly seen deserve unqualified praise, and perhaps this section is the most practically useful one in the book.

[1] Handbook of Diets. By Rose M. Simmonds, S.R.N., Dietitian to the London Hospital. London: William Heinemann (Medical Books), Ltd. 1931. Pp. 108. 7*s*. 6*d*.

[2] Your Vision and How to Keep It. By H. G. Merrill, M.D., F.A.C.S., and L. W. Oaks, M.D. Second edition. London: G. P. Putman and Sons. 1931. Pp. 145. 6*s*.

HULL ROYAL INFIRMARY.—The 148th annual report records that last year 4160 in-patients were admitted (19·98 days' stay), who cost £2 13*s*. 1¼*d*. each. There were 15,644 new out-patients who were treated at an estimated cost of 4*s*. 9¾*d*. per head. The opening of the Sutton branch has added 100 beds.

PONY RACE MEETING FOR A HOSPITAL.—Recently a "pony race meeting" at Northolt Park was organised on behalf of St. Mary's Hospital, Paddington, with the Earl of Harewood as one of the stewards. All the entrance and parking money went to the hospital, and a large sum was collected on the course by students from the hospital.

EAST SUFFOLK AND IPSWICH HOSPITAL.—Last year this hospital was busier even than during the war, 5074 patients having been admitted with an average stay of 18·42 days, the lowest figure on record by reason of the full use made of the Bartlet Convalescent Home. There were 18,240 new out-patients. In-patients cost £3 2*s*. per week each, and out-patients 7*s*. 5½*d*.